The Veterinary Record.

(Founded by William Hunting, F.R.C.V.S., 1888.)

No. 14 APRIL 2, 1927. Vol. 7.

Researches on Foot-and-Mouth Disease.*

By Capt. F. C. Minett, M.B.E., B.Sc., M.R.C.V.S., Ministry of Agriculture's Research Laboratory, Weybridge.

When asked some time ago by the Secretary to read a paper before the Society, the invitation was a welcome one, because I thought that it would afford those who have been working on behalf of the Foot-and-Mouth Disease Committee an opportunity of making known to the profession the present state of research in this disease. Owing to the fact that nearly three years have elapsed since the research was started, it is obviously impossible for me to treat the subject fully within the short time at my disposal. I intend to confine my remarks therefore, as far as possible, to what may be termed the practical side, and to restrict myself to observations which have been made in the Veterinary Laboratory of the Ministry of Agriculture. Dr. Maitland, who follows, will give an indication of what has been achieved at the Lister Institute.

[Capt. Minett here gave the names of the members of the Foot-and-Mouth Disease Research Committee and its terms of reference. He recalled the losses which had been sustained by the Committee in the persons of its former Chairman, Sir William Leishman, and also of Sir Stewart Stockman. Two reports of progress have appeared to date ; the first in 1925 and the second within the last week. These contain full details of what has so far been accomplished. The Institutes in which the work has been carried out are the Lister Institute of Preventive Medicine, by Dr. S. P. Bedson, Dr. H. B. Maitland, and Mrs. Y. M. Burbury, under the direction of Dr. J. A. Arkwright. At the Ministry's laboratory the work was under the supervision of Sir Stewart Stockman until the time of his death. Others who have been engaged in the work and to whom acknowledgements were made by Capt. Minett are Mr. G. O. Davies, Mr. D. Cameron, and Capt. W. Watt, who was in charge of the Experimental Station at Pirbright. Work has recently commenced at the National Institute for Medical Research by Mr. I. A. Galloway, under the direction of Capt. S. R. Douglas.]

The Virus: This belongs to the class of filterable viruses. Its filterability was proved exactly thirty years ago by Lœffler and Frosch, who were at the time working on behalf of a German Commission. It may be said that the first real researches into the disease commenced with this Commission in 1897.

The Disease in the Guinea-pig: Since that date a most notable landmark in the history of the research was the discovery in 1920 by Waldmann and Pape that the disease could be transmitted to the guinea-pig. Previous attempts by Lœffler in 1898 had given negative results. Hecker in 1899 claimed to have infected guinea-pigs, rabbits, a white rat and dogs, but for certain reasons his claims must be regarded as doubtful. Waldmann and Pape succeeded in infecting guinea-pigs with pig lymph by the intravenous, subcutaneous and cutaneous routes, though of these the cutaneous route was the most successful. Since 1920 the discovery of Waldmann and Pape has been confirmed by many independent investigators including those of our own Committee.

Though the guinea-pig may be infected by such routes as the intravenous, intraperitoneal and subcutaneous, the most satisfactory is the intradermal. Starting with a cattle virus in the form of infective epithelium, it is as a rule advisable to inoculate four healthy adults in the skin of the plantar surfaces of the hind legs. Lesions at first usually take two to four days to develop, but as soon as a lesion does appear it is necessary to passage it to further guinea-pigs by the same route. The virus becomes adapted in this way, and lesions begin to appear at the site of inoculation more speedily, so that after a few passages lesions in the form of vesicles appear as early as the 18th to 24th hour. Another result of passage is that the disease begins to generalise, *i.e.*, secondary lesions appear on the fore-feet and frequently also on the tongue. The mortality is about 5 per cent. on the whole, but as a rule there is more or less loss of weight. The disease in the guinea-pig resembles essentially that in the larger animals, but a very important distinction is that it shows no tendency to spread naturally among guinea-pigs. The reason for this is at present uncertain.

Virulence: It is usually said that the virus gains in virulence for the species in which it is being continuously passaged and at the same time loses virulence for other species. A virus which is adapted to the guinea-pig certainly loses much, but not all, of its virulence for cattle. So far, unfortunately, it has not been possible to make use of such guinea-pig virus for immunising cattle.

Others declare that the virus loses virulence for cattle by continuous transfer in bovines and that the best way to maintain the virulence of virus for cattle is to make alternate passages from ox to pig. This method is used in some Institutes on the Continent, where immune serum is prepared on a large scale. So far, we have not noticed any drop in virulence on passage in bovines. The only noticeable difference in virulence of strains which we have so far observed, has been in the case of two viruses, "A" and "O," which were received from Prof. Vallée. The "A" strain was of high virulence, but virus "O" was apparently very weak and produced late reactions

* A resumé of Capt. F. C. Minett's remarks on this subject delivered before the Central Veterinary Society on March 3rd, 1927.

and at times no visible disease at all in animals inoculated with it.

Virus filtrates: It is a piece of good fortune for workers on this disease that the virus is easily filterable. For much of the work filtrates prepared from the vesicle fluid of guinea-pigs may be used, and such have the advantage of being water-clear and, in the case of an adapted virus, are of high potency. In practice the fluid from the local vesicles of guinea-pigs, eighteen to twenty-four hours after intradermal inoculation, is collected by means of a pipette into a measured volume of saline and passed through a Seitz filter. Phosphate of M/25 strength and of pH 7.5 is then added. It is convenient for most purposes to have a final concentration of one part of vesicle fluid in fifty parts of such a saline-phosphate mixture.

Thanks largely to the efforts of Bedson and Maitland, workers are now in a position to estimate approximately the potency of filtrates by inoculating guinea-pigs intradermally with serial dilutions. Usually, filtrates may be diluted at least five million times without their infectivity for the guinea-pig's skin being lost. Such quantitative methods which enable filtrates of known strength to be used mark a great step forward in foot-and-mouth disease research.

Filtrates of pig lymph have been obtained in a similar manner, and titrated either intradermally on the snout of pigs or by giving constant volumes of the successive dilutions intra-muscularly. Both these methods appear to be good, but our experience so far is not very great.

Reaction: The optimum reaction is slightly on the alkaline side of neutrality. Phosphate solution of pH 7.5 at M/50 strength forms an admirable buffer for maintaining the reaction at this optimum. As the virus is very sensitive to changes in the reaction and particularly if these are on the acid side, simple saline solution does not form a good medium in which to suspend filtered virus.

Viability: The workers for the Committee have made an extensive study of the best means for maintaining the viability of the virus and of the effects of adverse influences upon it. The object of this study has been to collect further *data* concerning the viability of the virus in nature and to endeavour to ascertain what bearing such findings might have upon the incidence of outbreaks.

The two principal factors which influence the viability of virus filtrates *in vitro* are temperature and reaction. Temperature is also a very important factor under natural conditions. The life of the virus is best assured by a low constant temperature. As the temperature rises conditions become more and more unfavourable. Phosphate filtrates lose their strength slowly when kept at about zero, but actual freezing is to be avoided. On the other hand, it was found the virus contained in infective epithelium is not entirely destroyed by freezing and thawing repeated as many as twenty times. Pieces of dried guinea-pig epithelium were found to be virulent as long as 241 days in the cold room, and for 143 days at laboratory temperature. The effect of desiccation upon such virus-containing material has also recently been studied by Trautwein.

Spread of the disease in nature: A study of the possible transmission of the disease by such animals as rodents, birds, dogs and cats has formed part of the investigation. Judging by the difficulty with which the disease is transmitted from infective guinea-pigs to cattle placed in close contact, it is believed that rodents play little if any part in the spread of the disease in the field. Fowls and certain small birds have been found to be quite insusceptible to inoculation. After being fed with large amounts of infective epithelium it is only occasionally that traces of virus can be detected in the excreta.

Work on large animals: This has been carried out at the Committee's Experimental Station at Pirbright, Surrey, and experience has shown that the site chosen was a suitable one for an investigation of this sort. There have been a few cases of accidental transmission of the disease within the station itself, but while these were in a sense unfortunate occurrences, they yielded valuable information on the subject of virus types (*vide infra*).

The difficulties of work with large animals, in the case of such a disease as foot-and-mouth, will be readily understood. The disease is extremely infectious and the work is very costly, both from the point of view of animals and attendants. Progress is necessarily slow, and limitation as to number of animals frequently makes experimentation impossible. For these reasons and where possible experiments have, in the first place, been carried out in guinea-pigs, and the results then applied to the larger animals, chiefly cattle and swine. The majority of the inoculations have been made by the intramuscular route, and large doses of epithelium or blood have been employed.

Sheep have been found to be less susceptible than cattle or pigs as the disease is frequently slight and the lesions difficult to detect. In 71 instances in which the disease was observed experimentally in the ox, lesions were present together in the mouth and on the feet 63 times; in the remainder on the feet only. In 39 cases in sheep, mouth lesions were observed in two only; in 15 cases in pigs, mouth and feet lesions were simultaneously present in 11, in the remainder feet lesions only.

No special study has so far been made of the natural disease in large animals.

Virus types: One of the most important discoveries in foot-and-mouth disease within recent years has been that of Vallée and Carré in 1922. These authors described two types of virus, which they named "A" and "O" respectively. No distinction could be drawn between the types from the clinical point of view, but from the immunological standpoint there was an important difference. Animals which had been solidly immunised to virus of the one type were found to be quite susceptible to the other type, and this could not be accounted for by a difference in virulence.

It was naturally of the greatest importance to examine the claims of Vallée and Carré, and it was through the kindness of Prof. Vallée himself that we were furnished with virus of the "A" and the "O" types. As mentioned before, the "A" virus proved to be far more virulent than the "O" and our first impression was that the "A" virus was predominant and protected both against itself and against "O." As the result of an examination of selected strains from Great Britain this impression was quickly found to be erroneous, and we are happy to be able to confirm entirely the claims of the French authors. This has been done both in large animals and in guinea-pigs. Some difficulty was experienced at first in getting the "A" virus adapted to the guinea-pig, but this has now been achieved.

Subsequently we judged it to be of great interest and importance to classify strains collected from outbreaks in Great Britain. This was done in the case of seventeen strains from twelve separate centres of disease. The strains have been passed through large or small animals or both, and of the seventeen one only (from Sussex) was found to belong to the "A" type.

The problem of prophylaxis in foot-and-mouth disease has been made more difficult by the discovery of two types of virus, and it is possible that the complication will become still greater if the recent claims of Waldmann are substantiated. This observer has claimed recently that at least three main types of virus exist in nature, in addition to a number of varieties which could not be classified.

Immunity: Cattle which have passed through an attack of foot-and-mouth disease acquire an immunity. There has been considerable discussion in the past regarding this immunity, as it has often been regarded as transient, uncertain and variable. The ground has been somewhat cleared within recent years by the discovery that different types of foot-and-mouth virus exist, but on the other hand, according to Vallée, relapses are by no means always due to infection by the opposite type. M. Vallée quotes a case where an ox hyperimmunised with virus "O," was infected naturally by the same type of virus six months later. The same animal was infected by natural exposure to virus "A" one month later still. So far as our experience has gone with cattle infected experimentally by intramuscular inoculation, we have always found them immune to the same virus given by the same route. The longest time to which such immunity has been proved to persist in cattle was 13½ months.

Nature of the immunity: It is necessary in the first place to consider the guinea-pig, because following intradermal inoculation the skin of this animal responds with a very clearly defined local lesion. It is possible in the guinea-pig to distinguish two forms of immunity, *viz.*, complete and partial. Complete immunity develops as the result of a typical attack of the disease. The animal is completely immune to considerable amounts of virus no matter by what route this is introduced. Partial immunity, on the other hand, usually develops as the result of sub-infective doses of virus given by routes other than the skin. It also follows in certain instances the injection of immune serum or of virus which has been killed in certain ways, *e.g.*, by heat (32° C.) or by formalin. In this form of immunity the local lesion still follows the introduction of virus in important amounts into the skin of the hind pads, but the disease fails to spread to other parts of the body.

Independent observers have affirmed that in the case of the ox and pig also these two forms of immunity may be distinguished. Some have considered that a fundamental difference exists between the two forms. In complete immunity the skin is said to develop a tissue immunity which is independent of the presence of immune bodies. There are, however, certain reasons for believing that the distinction is purely one of degree and that immunity extending to the skin represents a more advanced stage of partial immunity.

I regret that with the short time at my disposal it is impossible for me to enter more deeply into this part of the subject. Much might have been said regarding the value of protective serum, the methods of estimating its potency and of the attempts which have been made in the past to produce active immunity in large animals.

Viability of the virus in meat carcases: References will have been seen in the press to the long periods over which the virus has been found to survive in meat carcases. It has been rightly considered that this forms one of the most important practical discoveries of the Foot-and-Mouth Disease Research Commission. This part of the work was begun months ago when the possibility was recognised of the disease being introduced into the country in this way. Preliminary experiments with guinea-pig carcases gave reason to believe that the virus could persist under certain conditions for long periods, and particularly in the bone marrow. Many guinea-pigs have been killed at the time when the blood is usually infective, and the carcases after being dressed were stored at temperatures between 0° and 7° C., and between 16° and 20° C. Portions of their tissues were taken for examination from time to time, and the following are a few of the results obtained.

At 0° to 7° C. in carcases which were bled, the blood remaining about the tissues of the neck remained infective for 21 days, the bone marrow from 21 to 87 days, and the kidney for 54 days (one case). In carcases which had not been bled and which were kept at the same low temperature the blood remained infective for 35 to 46 days, the bone marrow to 96 days, and the kidney from 20 to 53 days. The muscular tissue could not always be shown to be infective, even immediately after slaughter. The evidence, however, is in favour of believing that, as might be supposed, the infectivity of the muscular tissue depends upon the blood contained in it. One experiment with guinea-pig muscle indicated that muscle juice, on account of its acidity, is capable of rapidly killing the virus, as Lourens had previously shown for pig muscle.

At 2° to 7° C. epithelium on carcases may retain its infectivity for at least 102 days.

At 16° to 20° C. the blood of carcases contained virus for at least seven days in three cases, and the bone marrow for at least eight days in four cases, by which time the carcases were very putrid. Under these conditions the lesions on the carcases remained virulent for eleven to eighteen days.

A number of different brine solutions have been tested for their effect upon the virus in tissues. The majority of these are composed of salt, saltpetre, and sometimes sugar. In most of them the virus survived for at least five or six days at 18° to 20° C. Saturated salt solution appears to be an actual preservative for the virus, as whole guinea-pigs' feet immersed therein contained living virus in one case for forty-three to seventy days at 17° C. Similar feet placed in a corked tube at the same temperatures retained infectivity for twenty-one to forty days only.

Beef and bacon carcases: From the experiments with guinea-pigs we were led to expect a similar long survival of the virus in beef and bacon carcases stored at trade freezing (10-15° F.) and chilling (28-30° F.) temperatures. This has proved to be the case, as the following instances show.

At freezing temperature the blood of a beef carcase contained virus after forty-two days and the bone marrow after seventy-six days. This was true of bacon carcases also under the same conditions. At chilling temperature the bone marrow of beef and bacon carcases contained virus after forty-two days.

The processes of wet-salting and dry-salting of bacon carcases fail to destroy the virus contained in the bone marrow; this tissue having been found infective after forty-three days and not after seventy-six days.

One very important practical point which has appeared in these experiments is the great facility with which pigs were found to become infected when fed on crushed *bones* containing virulent marrow. This occurred on seven occasions out of nine.

Disinfection in foot-and-mouth disease: Work on this subject is still being pursued, but I cannot close without a reference to the finding that disinfectants of the coal-tar series are of relatively low efficiency against this virus. So far as we have gone, it appears that some of the heavy metallic salts, and particularly the salts of copper, will be found to be suitable for this purpose.

In conclusion, I trust that the above brief survey may afford some idea of what has so far been accomplished. While it is true that the main problem of the disease in this country still remains unsolved, it will perhaps be agreed that considerable additions have been made to our general knowledge of the subject.

Discussion.

Dr. H. B. Maitland (of the Lister Institute of Preventive Medicine) in opening the discussion, said:—

The practical problems of foot-and-mouth disease may be grouped, for purposes of discussion, under three headings, *viz.*, transmission of the infection, prophylaxis and treatment.

With regard to transmission, the means by which infection is transmitted to the first animals infected at the beginning of an outbreak may not necessarily be those which spread the disease from one animal to another during the outbreak. Experiments at the Ministry's Laboratories have shown that the feeding of infected carcases can initiate the disease, but supposing that an epidemic had originated in this way, the spread of the infection to other animals must occur in some other manner. The mechanism of spread throughout a herd is still obscure.

Valuable indirect evidence on the problem of transmission has been afforded by laboratory experiments on the viability of virus dried on various materials. At the Lister Institute the following results have been obtained. A small drop (0·02 cc.) of guinea-pig vesicle fluid diluted 1 in 5, was allowed to dry on fabrics, fodder, etc., which were stored at room temperature for varying periods. The viability of the virus was tested by soaking the material in a small quantity of physiological saline and inoculating the liquid into guinea-pigs. Virus dried on silk fabric was infective for one but not for two weeks; on woollen fabric it was infective for two but not for three weeks; on hay, virus remained infective for as long as fifteen weeks; on bran for at least ten weeks; on cow's hair for four weeks, on sand for two weeks.

The American Commission which worked at Strasbourg and at Alfort have reported the survival of virus on hay and on sand, under field conditions, for 25—30 days.

In an experiment at Pirbright, hay was contaminated with saliva from cattle during the acute stage of the disease and stored in sacks. One bovine was infected by feeding hay that had been stored for four weeks.

Another matter of interest is the infectivity of saliva. Recently Waldmann and Reppin have reported that in cattle the saliva may contain virus as early as nine hours after experimental infection and before there are any macroscopic changes in the tissues of the mouth. The virus was present in the saliva for as long as six days p.i. and in bits of epithelium which were being shed from the vesicles of the mouth for as long as eleven days.

The American Commission and, earlier, Lebailly, also made similar observations.

The possibility of the existence of carriers is of importance in relation to transmission. The American Commission examined twenty living cattle, specially selected by the Swiss authorities, but were unable to detect a carrier. They also examined *post-mortem* the feet of twenty-two cattle and one pig at various times after infection, for the presence of virus in closed or healed lesions in or about the hoof. In only one instance—a cow thirty-four days p.i.—was virus found. Lebailly has recorded observations suggesting that cattle are rarely, if at all, carriers, but one hesitates finally to draw the conclusion from negative results that carriers do not exist or are of little importance in the transmission of the disease.

With regard to the problems of prophylaxis, two main possibilities of protecting animals have to be considered, passive protection by the use of serum and some means of active immunisation. Serum is being extensively used in Germany and many papers have appeared stating that it is of value in preventing infection for 12-14 days. Up to the present, the efforts of the Committee have been chiefly directed to exploring the possibilities of active immunisation, and much preliminary information has been obtained in experiments made with guinea-pigs. Virus killed by contact with formalin has been used as a vaccine with encouraging results. By giving guinea-pigs several inoculations of formalised vaccine it has been possible to protect them against infection by the route to which they are most susceptible, *viz.*, intradermal inoculation of the plantar pads. The difficulty in extending this method of protection to cattle on a large scale is the limited supply of virus from which to make vaccine. The only sources of virus at present available are the tissues and blood of an infected animal. So far, attempts to cultivate the virus outside the body have been unsuccessful, although many experiments have been made

with this object in view. Work on these lines is continuing.

With regard to treatment, the use of serum in the febrile stage of the disease is said to reduce the severity of the infection and to be of value in selected cases. From time to time various chemicals have been brought forward, for example, the salts of bismuth and iodine, but no chemical treatment has, up to the present, established itself as having definite specific value.

Major-General Sir JOHN MOORE: I am sure you will all agree with me when I say that we are very deeply indebted both to Captain Minett and to Dr. Maitland for having come amongst us this evening and given us their experience with regard to this mysterious malady, foot-and-mouth disease.

To me the disease is of absorbing interest, as I am sure it must be to all those who have served in India—Major Wall, Major Rees-Mogg and Captain Reynolds—who have seen the disease in all its phases and have not had their knowledge of it cut into by the destruction of the animals, as happens in this country.

The Second Progress Report of the Foot-and-Mouth Disease Research Committee is now out and it can be purchased at any of the Government Stationery Offices. It is a very interesting report and we are greatly indebted to the Committee for their great work. They have extended the knowledge of the virus of the disease; they have explored the susceptibility of the smaller animals that may be blamed for the transmission of the disease; they have determined the viability of the virus under a variety of conditions and they have ascertained the sensibility of the virus to various chemical agents—all points of very great importance.

Dr. Maitland made mention of hay and straw as being of importance not only because of the length of time the virus can remain virile in them but because of the part played by them in the communicability of the disease. I can bear that out, because in India it is a common means of conveying the disease. In India the grain is threshed by treading by the ox, and feeding on the broken straw or bhoosa is a common method by which the disease is transmitted to transport animals in India. I was very glad to hear Dr. Maitland mention formalised vaccine. I am convinced that a chemical agent has as much chance of preventing foot-and-mouth disease as any purely biological substance. He also mentioned the use of serum in Germany. In Vienna, two years ago, I was told by Professor Gerlach that he used serum as a preventive, and that it was only of value for ten days. With regard to the period of incubation in Austria I helped to conduct an experiment and we found that in two cases by rubbing the mouth with hay saturated with virus from an existing case, one eighteen-months-old bullock contracted the disease in exactly thirty-eight hours and the second one in forty hours. The whole of the herd, excepting two animals, had the disease by the fourth day. That is a good instance of the period of incubation in cattle. I am not prepared to say how long it is in other or smaller animals. Though the cause of the disease is still very obscure, I think we are right in saying that in recent years in this country the effects of outbreaks are much less serious. Statistics in recent years prove it. I am convinced that the discovery in the Lanarkshire outbreak of the viability of the organism in imported carcases, and the action taken by the Government in control, has greatly reduced the incidence of the disease in this country and will continue to do so so long as the Government sticks to that policy. There can be no question, also, about the slaughter policy being the right one. I took the trouble this morning to put down the figures in the recent outbreaks. In 1923, before this Commission was appointed, there were roughly 2,000 outbreaks, the cost of which was £2,220,000. In 1924 the outbreaks were reduced by twenty-five per cent. and the cost came down to £800,000. In 1925 outbreaks numbered 204 and the cost was only £180,000. In 1926, in the first two months of the year there were only nineteen outbreaks as against thirty-nine during the same period in the previous year. It is curious that this disease always is worse in the winter—that is the case in all aphthous diseases; we had an example of that in France, in stomatitis of the horse. Taking Germany in the same years: in 1924 there were 40,000 outbreaks; in 1925, 50,000 and in 1926, 187,000. In Denmark there were in 1924, 8,000 outbreaks; 1925, 53,000; 1926, 97,000; Holland: 1925, 31,000; 1926, 62,600. France: 1925, 17,000; 1926, 48,900. Belgium: 1925, 3,000; 1926, 33,500. Therefore, when you consider these figures, it is obvious that, in the first instance, our policy of slaughter is the correct one, and, secondly, that there is great risk of infection from those carcases of animals that come over to this country from abroad. When you get bone marrow, as has been proved, infective for as much as seventy-six days and for forty-two days even after the bone marrow has been pickled, it is up to us to be very careful with regard to carcases that we import.

Dr. W. H. ANDREWS: I should like, in the first place, to add my expression of appreciation to Capt. Minett and Dr. Maitland, because I certainly think that to-night they have given us a very clear exposition of work which must have been most difficult to summarise.

With regard to the whole foot-and-mouth disease question, as Capt. Minett has pointed out, he has dealt only with the research side of the question, and with the application of these facts we in the laboratory are not concerned. It is our duty to explore every possible avenue, with the main object of offering weapons to those who have to deal with these matters in the field, but how they are actually dealt with is not our concern, nor are we qualified to give an opinion upon them. As an instance, I will quote rinderpest. We all know that rinderpest was dealt with in this country by the method of slaughter, and that subsequent to that time science has put other methods in the hands of those who have to deal with it. Nowadays, those who have to deal with outbreaks of that disease would be considering the alternatives of passive immunisation and active immunisation by the mixed serum-virus method. But now we have those methods available, we can realise that circumstances might arise in any country when slaughter might be the best method to adopt. It is for those who have the administration of the thing in their hands to choose.

Major H. KIRK: Capt. Minett mentioned the question of transmissibility of the disease and, speaking in reference to birds, he gave me the impression that they do not transmit the disease unless they take the disease themselves. I understood that in their case the transmissibility was governed by their previous treading on manure, etc., and taking the infected material away on their feet.

Sir JOHN MOORE: I omitted to mention one interesting point with regard to the transmissibility of the disease to human beings. Dr. Reisinger, of the Vienna High School, told me of an instance in which the disease was not only communicated from the ox to the human being, but from the human being back again to the animal. That is rather an interesting point and I think it might be recorded in our meeting. I ought to have referred to it when I read my paper on foot-and-mouth disease a short time ago.

Capt. ROSS GRANT: There was one point which was of very particular interest to me as an Australian, and that was the possibility of the existence of carriers. Australia and New Zealand are about the only two countries in the world which have not had experience of foot-and-mouth disease. We are anxious to resume the importation of pedigree stock from Great Britain which has been prevented by the outbreaks here. This embargo is being taken off in Scotland, provided the importation is direct, and a scheme is at present being worked out to make such a thing possible in regard to England. My point is that in the interests of the pedigree

stock breeders and of our Dominions the question of "carriers" is one of the lines of work which ought to be investigated very fully. Another point that interests us very much is the possibility of mechanical carriers.

Mr. W. PERRYMAN: I should like to be enlightened in regard to the following point. Presuming an outbreak of foot-and-mouth disease occurs in a herd, the first and second cases will probably be the result of direct infection from, we will say, food, or some other outside source. The other animals will not be moved. How does the writer suggest that the infection is carried to the whole of the herd—is it by infection of the atmosphere, or how? These others will probably all show the infection in three or four days. Another point: Are there any restrictions as to the importation of other things than hay and straw?

Major F. T. G. HOBDAY: I want to ask whether the respective iodine methods of Walker in India, and Vendel in Denmark have had any consideration by the Ministry and what results have accrued if they have been tried; also, whether in the experiments that have been done the essayist has ever met with the more virulent form of foot-and-mouth disease in which the animals, when they are apparently getting better, suddenly give a cry and drop down through heart trouble?

During the war I saw one of the biggest outbreaks the world has ever seen, in the Provinces of Milan, Tuscany and Cremona, in Italy. It appears to occur about every fifteen or twenty years in Italy. The *post-mortem* appearances were not unlike those of rinderpest. The outbreak to which I am referring killed off so many cattle that horse flesh was preferred to cow flesh at that time. I think that Capt. Minett's paper has demonstrated to us to-night the patience required by workers in research at the laboratories. He has shown how nicely the threads of the investigation can be picked up and pieced together for placing before us.

The Carluke outbreak was of great importance, and I think that the superiority of the scientific methods of the skilled veterinary inspector over the methods of the layman were never better exemplified than in this instance.

THE REPLY.

Capt. MINETT: I have to thank Dr. Maitland once again for coming along to help me out to-night. I told you as much as I could in the time at my disposal; he has amplified my remarks and added to them from his experience at the Lister Institute.

He has stressed the want of knowledge of the methods of transmission of this disease in nature and that, as has been pointed out, is a thing which the Committee has had very largely in mind. We really want to know a tremendous lot more with regard to how the disease does have its origin in herds and after it has originated—we may suppose in one or at most two animals—how it spreads to the others. It was Mr. Perryman, I think, who quoted the sort of instance which we believe does occur, in which infection arises in one or two animals only. How does it spread to the rest of the herd? That, in common with many other questions which have been raised to-night, is a thing which the Committee has in mind.

More information is required regarding possible methods of aerial transmission. We want to see how far the virus can be carried by the air under different conditions. Judging by the constancy with which the disease is transmitted by close contact and from the fact that animals are highly infective in the early stages before vesicles appear, I cannot help thinking that such animals may be breathing out large quantities of virus. It is possible, therefore that the way in which infection is naturally transmitted is by the respiratory tract, rather than, as has been supposed, by intradermal penetration of the virus about the mouth.

With regard to the infectiousness of saliva, Waldmann and Trautwein have shown recently that as early as nine hours after the animal has been inoculated and before vesicles are present in the mouth, the virus may be found in the saliva.

The question of carriers is undoubtedly a very important one and we have not yet done any experiments in regard to them. So far as I know, apart from someone mentioned by Dr. Maitland, who found animals to be carriers for a month, it was Zschokke in Switzerland who made the strongest claims to have found carriers in this disease. Zschokke stated that consequent upon lesions on the feet of cattle the virus might be retained in clefts or spaces in the horn. The virus was said to have been liberated from such clefts when the horn was pared as long as three months after infection and outbreaks had been started in this way. Dr. Maitland referred to experiments on the carrier question made in Europe recently by the American investigators. Their endeavours to show the existence of carriers gave negative results. Vallée also, as the result of his work, is of opinion that carriers do not exist. There is one part of the body on which the virus might be held up for some time and that is on the animal's coat. We have it in mind to determine how long virulent saliva can remain infective on cows' hair under natural conditions.

Dr. Maitland has given us a little information with regard to the procedures that are adopted in Germany in combating the disease, and has referred to the use of serum. Serum immunity is of course transient. I have recently been doing some work with immune serum in guinea-pigs and have been impressed by a fact which appears to be important. If the dose of serum given is insufficient to afford complete protection, the appearance of vesicles may be merely delayed. In these experiments the animals are infected on the hind feet at the same time as the serum is given and if the serum is insufficient in amount secondary vesicles are liable to appear as late as the seventh or even the tenth day. In the case of cattle in the field it is possible that the same sort of thing might arise, especially since the serum is rather weak, and the amount required to give protection is large.

Dr. Maitland mentioned a point about the treatment of animals and the drawbacks attached to the use of serum. Serum is undoubtedly of great value in certain cases, as for instance in the protection of young animals. These react very severely at times and frequently die, and mortality can be reduced by means of serum.

With regard to the question of the difference between tissue and blood immunity, my own impression is that there is no fundamental distinction between tissue immunity and the immunity of the body as a whole. I think that immunity of the skin is due to the presence of immune bodies in the blood. By the use of serum alone it is possible to bring about a certain degree of skin immunity which can be shown by using small amounts of virus for the test inoculation.

Sir John Moore and Professor Hobday mention treatment of cases with chemical products. Many drugs have been tried in this disease, and it is claimed with success in many cases. I have no experience with chemicals but they should certainly be investigated. Personally, I should like to see some salts of copper tried again, because some of these happen to be particularly efficacious against the virus *in vitro*. Professor Hobday raised the question of treatment with iodine on the lines proposed by Walker and by Vendel. It has been arranged to make tests with this reagent.

With regard to the point raised by Major Kirk concerning birds, I am afraid that the fact that he misunderstood me was my own fault, but it was necessary to cover the ground quickly. The first thing to be found out was whether birds could be infected and if so whether they could actively transmit the infection to other animals. We have answered that in the negative by showing that the virus does not live for any length of time in the bodies of birds. It is, however, quite conceivable that the virus might be carried on the feet, but I think it would be more important to know to what extent it might be carried on plumage. That question still remains unanswered. We have devoted a good deal of time to the problem whether virus can be carried in the alimentary tract of birds. We have fed enormous quantities of infective material and examined the excreta at intervals but in rare instances only have we

(Continued at foot of first column next page.)

The Relationship of Spasmodic Colic to Twist of the Small Intestine.

By Lt.-Col. J. W. Rainey, M.R.C.V.S., Bow.

The writer supposes that the nature of common colic and ordinary "twist," as well as their relationship to each other, are capable of reasonable explanation more briefly than is usual in classical discussion. Common symptoms suggest a common cause and a common cause suggests that ordinary spasmodic colic and ordinary twist of the small bowel are but different degrees of a similar condition. This condition is supposed to be a temporary paresis or devitalisation (varying in degree and extent) of the small intestine, due to local intoxication by the products of food fermentation, usually in conjunction with fatigue. The seat of the pain is supposed to be at the junctions, more or less, of vital motile intestine with the temporarily inactive area and to be due to the interference with the normal rhythmical peristaltic movements as they expend themselves vainly and painfully against this relatively inert barrier. Twist of healthy constantly active small intestine is as impossible as it would be for a bundle of living snakes or worms to tie themselves into inextricable knots; every unduly extensive movement in one direction is immediately countered by a muscular pull in another, so that the normal relative positions of parts are constantly and naturally maintained by restless muscular activity. On the contrary, twist of a length of intestine in which a sufficient degree of paresis or devitalisation exists is easy, as the tangling or knotting of any lifeless material is easy.

Such a theory involves the possibility of the occurrence of a temporary, limited, and non-fatal twist, of which resolution or recovery takes place when, with re-awakening of the normal intestinal motility, a rapid restoration of the normal positions of parts is effected. There is consequently a fine point beyond or within which death or recovery results: here is the practitioner's opportunity to cure or kill.

If the foregoing explanation is even approximately correct, the local detergent and general re-vivifying action of the hypertonic salt solution of Lang's method appears superior to other forms of treatment in principle as it is in practice, and the drastic alkaloidal purgatives stand condemned. Narcotics also appear in their proper light, simply as measures taken to allay pain and violence.

Inasmuch as slowly-acting purgatives, such as aloes in bolus, cannot be expected to pass through an intestine in which peristalsis is in abeyance, the utility of such a form of medication must be limited to the good effect that may follow when diagnosis is at fault and the condition is not that of spasmodic colic but impaction of the colon.

Forced exercise, or keeping a horse "on its feet," can hardly assist a state of arrested function due to fatigue or locally-acting toxins, for recovery from which increased exhaustion cannot be helpful.

In arriving at the foregoing theoretical explanation of the relationship of colic with twist, the writer has kept twist proper, or volvulus, quite distinct in his mind from strangulation due to a rupture of the mesentery. He believes he is on safe ground in concluding that the latter condition is always traumatic in its inception. This view is supported by the clinical histories and *post-mortem* examinations of cases, as well as by the observations of other workers.

Finally, it is desired to acknowledge the original observations of Mr. Caulton Reeks on the etiology of spasmodic colic as the source of whatever there may be that is worth consideration in this attempt to define more clearly and briefly than hitherto the relationship of spasmodic colic to twist.

(*Continued from previous page.*)

been able to detect the virus in the fæces or indeed at any point along the intestinal tract.

Answering Mr. Perryman, I do not think that there are any restrictions at present on importation of foodstuffs other than hay or straw. Finally, with regard to Prof. Hobday's question as to the virulent type of foot-and-mouth disease. On the Continent there have been many cases of malignant infection as well as a type described as "apoplectiform," in which deaths may be sudden. Terni in Italy has described a nervous type which may perhaps be the same. In this country foot-and-mouth disease of this degree of malignancy has not been seen, so far as I am aware.

Tuberculosis and Milk.*

By Nathan Raw, C.M.G., M.D.,
Lord Chancellor's Visitor in Lunacy.

(*Reprinted from The British Medical Journal, February 26th*, 1927).

In the *British Medical Journal* of 1903 I ventured to suggest that bovine bacilli conveyed by milk played an important part in causing tuberculosis in children. This has since been confirmed by many other workers, and is now accepted as a serious menace to child life.

The International Congress on Tuberculosis which was held in Washington in 1908 will always be remembered on account of the discussion which took place on the part played by the bovine bacillus in the production of tuberculosis in man. We were honoured on that occasion by the presence of the great master, Robert Koch; and those of us who took part in the secret session will never forget it. Up to that time Koch had not publicly admitted that bovine infections in man were possible, but he later modified his views, and we are all now agreed that an important amount of tuberculosis, especially in children, is directly conveyed from the dairy cow.

At that conference I read a paper, entirely based on clinical and hospital observation, pointing out the possibility that surgical tuberculosis in children, such as enlarged lymph glands, mesenteric disease, and affections of bones and joints, were separate and distinct infections from those of pulmonary tuberculosis, and might be caused by milk. The brilliant pioneer work of our president, Theobald Smith, on the rôle of the bovine bacillus, stimulated many workers, myself included, to further investigation, and it is particularly fitting that, eighteen years afterwards in this city of Washington, Dr. Park should tell us of the immense reductions in infant mortality and suffering as the result of their researches.

The incidence of bovine tuberculosis varies in different countries, and depends upon the extent to which cattle are infected with tuberculosis and the amount of uncooked milk, butter, cheese, and other dairy products consumed. In England and Scotland dairy cows are very heavily

* Read before the International Conference on Tuberculosis, Washington, October 2nd, 1926.

affected, with the result that surgical tuberculosis is very common in children.

In the light of our present knowledge we cannot say with certainty which particular strain of bacillus has caused the infection. We are accustomed to recognise three types of tubercle bacilli; human, bovine, and avian. I feel convinced that there are several intermediate strains of bacilli, which we cannot yet recognise with certainty, and it is not possible to say without bacteriological and animal tests to which group those from any lesion belong. For this reason, for the purpose of determining milk infections, clinical and hospital evidence is valuable.

Pulmonary tuberculosis is in a class by itself, and is practically always caused by the human type of bacillus, which also causes laryngitis, secondary intestinal ulceration, and fistula. It is rare for such cases to develop any other lesions. On the other hand, bovine infections in human beings rarely cause pulmonary lesions; in fact, they seem to be antagonistic to each other, and it is possible that a primary bovine infection, such as enlarged neck glands, may produce immunity against pulmonary tuberculosis for life.

Should this theory prove correct, the beneficial effects of sterilisation of tuberculous milk may be followed by diminished resistance to human infection in the form of pulmonary tuberculosis. In any case it is imperative that the milk supply be pure and safe for children.

Avian bacilli, though considered to be non-pathogenic to man, may contaminate a milk supply, but with what effect we do not know. In Denmark the danger of infection of pigs by avian bacilli is so real that legislation has been introduced forbidding chickens on the farm.

To sum up. In my opinion—

Human bacilli produce:

1. Pulmonary tuberculosis.
2. Tuberculous laryngitis.
3. Secondary intestinal ulceration.
4. Fistula in ano.

Bovine bacilli produce:

1. Enlarged lymph glands.
2. Abdominal tuberculosis.
3. Lesions of bones and joints.
4. Meningitis.
5. Acute miliary tuberculosis.
6. Lupus.
7. Rarely, secondary extension to lungs.

These infections are antagonistic to each other, and human and bovine bacilli are rarely found in the body at the same time. The practical measures that should be taken against bovine infection are eradication of tuberculosis from dairy cows and pasteurisation of all milk for human consumption.

Eradication will for a long time be impossible; pasteurisation is a safe and certain remedy. The results in several large cities where compulsory pasteurisation is law are truly wonderful, and have resulted in the saving of the lives of thousands of children every year, and endless pain and suffering with lifelong deformity. I sincerely trust the splendid pioneer work in New York and other American cities will soon be universal. At the same time it is imperative that every effort should be made to stamp out tuberculosis in dairy cattle.

It is estimated that in England about a million dairy cows are affected with tuberculosis. The cows with udder disease are, of course, the most dangerous. The compulsory seizure, isolation, and slaughter of these cows is a slow, laborious, and very costly procedure. The new Tuberculosis Order recently made in England will in time have a most beneficial effect in removing diseased cows from dairy herds, and so reducing the amount of bovine infection in children. In addition it is to be remembered that the financial loss to stock breeders and farmers from tuberculosis is enormous.

The question of the possible immunisation or vaccination of cattle against tuberculous infection is of supreme importance, and as practically all cattle are born free of any tubercle—infection taking place after birth—the problem ought to admit of a solution.

I would like to lay before this conference the results of my own work, during the last eighteen years, in attempting to produce immunity in animals against tuberculosis. In 1906 Professor Koch gave me in Berlin a pure culture on glycerin agar of human bacilli from a virulent case of pulmonary tuberculosis. Professor Calmette, then of Lille, supplied me with a virulent bovine culture from the mesenteric glands of a cow, and Professor Bang, of Copenhagen, gave me a culture of avian bacilli from the liver of a chicken.

These cultures have been subcultured on glycerin potato and transferred to glycerin agar every month for twenty years in my laboratory, and the present growths represent the 241st generation. At the end of 1914 I was afraid the work would be interrupted, but I took the cultures with me to France, and as I had a good laboratory in the hospital I was able to continue the subculturing there for the next four years. The growths are still profuse and true to type, but they are now completely non-tuberculogenic and non-pathogenic to animals.

Every year since 1906 I injected these bacilli into animals with a view of testing their pathogenicity; until 1913—that is, the 84th generation—I noticed no change in their virulence. After that time attentuation became marked, and in a series of inoculations of these bacilli into animals in 1914 they were observed to be avirulent. These experiments conclusively prove that virulent tubercle bacilli can be attentuated to such a degree as to be avirulent and non-pathogenic to highly susceptible animals. Some hundreds of animals have been inoculated to test the powers of immunisation of healthy animals, and with excellent results. For the purpose of immunising calves a vaccine was prepared from attenuated cultures of human bacilli. It is a bacillary emulsion of killed bacilli, and contains all the products of the bacillus. Living bacilli are never used; they are destroyed by heat before preparation.

Calves that are to be immunised should be separated from the mother at birth and fed on healthy milk for a week, when the first dose of vaccine is given; this is followed a week later by the second dose. They then associate with the other animals. The injection is given hypodermically in the usual way, under the skin of the abdomen, with strict antiseptic precautions. The method is only applicable, of course, to healthy animals.

During the last four years over 600 calves in valuable pedigree herds have been vaccinated by careful veterinary surgeons, and tuberculin tests at intervals of six months have so far been most satisfactory; the duration of immunity in 120 calves has been over three and a half years.

The problem of tuberculosis resolves itself into the question of immunity, and, in my opinion, we want to aim at producing an immunity in the animal against the amount of infection it is likely to encounter in ordinary life. It is almost impossible to immunise any animal against a lethal dose of virulent culture. The protection of the community by some safe scientific method of active immunisation is the only effective way by which this preventable scourge can be eradicated.

Turning to the question of human immunity, the problem is much more difficult, as children are susceptible to both human and bovine infection. At the special request of the parents in a large tuberculosis colony to which I was attached, and where each father has pulmonary tuberculosis, I gave all the children, over a hundred in number, two doses of protective vaccine prepared from dead attenuated bovine bacilli, with the object of protecting them from human infection. So far they appear to be healthy, but it will require at least ten years of observation before we can give any definite opinion as to its efficacy.

In conclusion, I am of the opinion that it is possible to immunise cattle against ordinary infection by using killed cultures of attenuated human tubercle bacilli, in precisely the same way that we can give immunity to man against ordinary infection of typhoid and paratyphoid by using dead cultures of typhoid bacilli. Animals cannot withstand large doses of virulent bacilli as a test of immunity, and I cannot see that it is necessary to give them. Our aim is to protect animals and children against the ordinary infection they are likely to meet with in life, and not against a lethal laboratory dose of virulent bacilli. In my opinion it is not necessary to use living organisms for the purpose of producing a relative immunity against tuberculosis.

The Veterinary Record.

2nd April, 1927.

RECENT FOOT-AND-MOUTH DISEASE RESEARCH.

Two recent events of considerable interest to members of our profession are the publication of the Second Progress Report of the Foot-and-Mouth Disease Research Committee and the interesting discussion, reported in this issue of the *Record*, which took place at the meeting of the Central Division of the National Veterinary Medical Association, when Captain F. C. Minett presented his paper on "Researches on Foot-and-Mouth Disease."

The Committee are to be complimented on the excellent organisation of the work and the systematic way in which the problem is being tackled, and the various investigators who are responsible for the work for the collection of observations and the excellent bibliography on recent work in this field, which should prove invaluable to the workers engaged in the study of this disease, both in this country and elsewhere.

As the report shows, a vast amount of necessary confirmatory work has been carried out and the original observations and standardisation of the technical methods, essential for the satisfactory carrying out of such a scientific investigation, have cleared the way for a rapid advance.

Certain of the more salient features of the recent work were referred to by Captain Minett in his paper. The wealth of facts relating to the viability of the virus under various conditions (in dressed carcases, dried on bran and hay, etc.), its degree of resistance to heat and chemical agents, the susceptibility of various animal species, the confirmation of the plurality of strains and the elucidation of certain facts relating to immunity, serve to illustrate the determined effort that is being made in the progressive unveiling of the forces of nature in the attempt to subjugate them to the uses of mankind in the struggle against this dread malady of such economic and world-wide importance.

Research on foot-and-mouth disease is inevitably slow, but there is little doubt that the concentrated systematic study of all aspects of the disease which is being made in the various institutes in this country and on the continent, will ultimately lead to a satisfactory solution of the problem. As most workers who have been engaged on the study of foot-and-mouth disease know, there appear to be at times almost insurmountable difficulties, but a confirmed optimism and persistent effort are necessary, for scepticism is a poison to intellectual effort. No theory is too fantastic, no line of effort too seemingly futile to be tried in an attempt to solve such an important problem. It is the gradual accumulation of facts, though in themselves of little obvious importance, which will one day give *un ensemble* which will be of value and perhaps lead to the ultimate goal, and patient and careful research is what is called for.

One of the chief difficulties associated with the disease is the fact that up to the present none of the apparently successful efforts to cultivate the virus can be repeated at will and no method is available to demonstrate the presence or absence of virus *in vitro*. Although probably the virus could, like vaccinia, be propagated in tissue culture (using embryonic pad of a guinea-pig in plasma) it is questionable whether this could be of any considerable value, as no greater quantities of virus could be obtained than from the pad vesicle after intradermic inoculation and, moreover, the technique is tedious and the sources of error are difficult to control. Thus, each experimental animal must be looked upon as a test tube of culture medium and two basic factors have to be considered—the virulence of the virus and the individual susceptibility of the test animal. The biological complex associated with the latter is always a possible source of error in the interpretation of results. If we might be permitted to illustrate our point in this connection, we might refer to the study of the bacteriolytic agent (known as bacteriophage) *in vitro*. In this case, the conditions of environment may be varied at will. On the one hand, conditions may be chosen which favour the activity of the lytic agent or, on the other hand, conditions may be chosen which favour the growth of the bacterium and result in the eventual disappearance of the activity of the bacteriophage. *In vitro* such variations are within our control and easy to produce, but when the animal body has to be used for the interpretation of results it is obviously impossible to control to the same extent conditions of environment or appreciate fully the reactions taking place in the host.

The chronology of events following upon the inoculation of experimental animals varies within wide limits. Even in natural contagion such extreme periods of incubation as thirty-six hours and fourteen days have been recorded.

In attempting to demonstrate the absence or presence of virus or in immunity tests, *le terrain animal* is, therefore, of primary importance, and the greatest care has to be exercised in comparing the reactions in different animals. Satisfactory conclusions can only be drawn from carefully-controlled experiments carried out on a sufficiently large number of animals.

When one takes into account the attendant difficulties, the patience, time and attention to detail required to carry out such experiments, one cannot but feel satisfied with the work done by the Committee and hopeful that the investigations so excellently commenced will be carried on successfully and will lead to useful results.

CLINICAL AND CASE REPORTS.

Some Conditions of Undetermined Etiology in the Dog and Cat.

By Professor A. R. Smythe, M.R.C.V.S., D.V.S.M.,
Royal Veterinary College, London.

A passing remark by Mr. Prime, in the *Veterinary Record* of February 19th, is worthy of further comment—"There is still a tremendous amount more to be recorded in veterinary literature, as it is very scrappy and incomplete compared with medical literature."

This statement is perhaps only too true, but it must be qualified, as medical literature is far from being complete and our sister profession has her many complexities and problems which have yet to be solved.

One hopes that obscure points may gradually be explained and I would emphasise that it is the clinician who is able to throw light on the subject by recording selected cases, and, more especially, those periodic epidemics which occur amongst his patients.

He is in a position to supply *data* and material to the pathologist and to bring to his notice those points requiring elucidation.

In the issue of the *Veterinary Record* of November 27th last, Mr. Henry Taylor, of Hayward's Heath, recorded some cases of internal hæmorrhage in dogs, but no further observations have been made on the subject.

When in practice in the early part of 1924, I observed a somewhat similar disease in dogs and it is within my knowledge that a like condition was existant in dogs in other parts of Cornwall during the same period.

One case, a fox terrier, 18 months old, was stated by its owner one Sunday evening to be unwell.

A clinical examination revealed no leading symptom of value; the temperature was elevated 1·5° F. and there was a slight coating of the tongue and injection of the conjunctiva; vomition and diarrhœa were absent and the dog seemed fairly lively.

The following day depression was more marked and on the Tuesday morning the animal was in a state of collapse and comatose.

As the condition was hopeless the animal was destroyed and a *post-mortem* made immediately.

On penetrating the abdominal wall, a quantity of hæmorrhagic fluid welled out and the viscera appeared to be lying in a bath of blood. Further examination of this fluid showed it to be rather more fluid than blood and with little tendency to clot.

As a matter of interest, a film was made and stained both from this and one subsequent case, and both showed the presence in large numbers of very small ovoid bacteria exhibiting bipolar staining affinities.

Five cases were observed presenting similar features and since that date I have not observed a similar condition.

The only other outstanding feature which presented itself during the course of the *post-mortem* was the condition of the liver; this appeared to be engorged with blood and in a condition of acute hepatitis and the seat of the hæmorrhage into the abdominal cavity.

During the latter half of last year in the College Clinique we were constantly being confronted with a disease of dogs presenting the following symptoms:—vomition, diarrhœa, an elevation of temperature of several degrees, an intense congestion of the conjunctival mucous membrane which came to resemble raw beef in colour, excoriation of the lips, more especially at the junction of the upper and lower, the affected parts being coated with a greenish-tinged slimy, purulent discharge, an urticarial condition of the skin in various parts of the body, in which the epithelium was shed and the denuded portions became coated with a dried exudate, serous in colour.

Convulsions usually developed after a few days, but generally the prognosis was favourable, as the diarrhœa began to subside towards the end of the first week and the convulsions became less frequent and the animal became convalescent.

Amongst our feline patients we are periodically meeting with cases which are epidemic and undoubtedly contagious, but which have received very cursory attention in veterinary literature.

These cases, from their clinical symptoms, naturally fall into three main types.

The first, which has been more especially prevalent during the last few years, is a form of contagious gastro-enteritis and appears to be described in Hutyra and Marek under "Croupous Enteritis of Cats."

Many practitioners call this condition cat distemper, but I know of no reason which justifies the use of this term.

The disease occurs in epidemic form at various intervals; it infects cat houses and where a number of cats are kept it is not unusual to find individual members developing the disease at intervals of a few days.

The condition, as first brought to one's notice, is marked by vomition at frequent intervals of a greenish bile-stained fluid, and a profuse diarrhœa. On palpation in the epigastric region, the animal invariably gives forth a plaintive "miaow."

The fauces are congested and the sclerotic underlying the external canthus is the seat of a peculiar venation, owing to its congested condition.

The incubation period would appear to be only of a few days' duration and death usually closes the picture in from 36—72 hours.

The mortality is extremely high and the few cases that survive refuse all food for long periods.

Post-mortem will show the small intestine and sometimes only the middle portion, to be the seat of an acute enteritis; the bowel is thickened and inflammed and the serous coat is involved.

There is some excess of peritoneal fluid which shows a mixed bacterial infection.

The second condition is one which is perhaps best described as being a form of contagious stomatitis and characterised by a condition of inflammation of the gums and more especially of the tongue. The margins of the tongue show multiple ulcers and large areas of the glossal mucous membrane are often shed, leaving raw areas.

The fauces are congested and the cat will show malaise and lowered vitality.

Although the condition is fatal in some cases, generally the mortality is much lower than in the preceding condition. Convalescence is prolonged and the cat will often refuse all food for prolonged periods ; the breath is often extremely offensive.

The third condition is a catarrhal one, accompanied by a profuse muco-purulent discharge from the nostrils and the usual malaise. It may occasionally occur in association with the condition of conjunctivitis, but is more commonly unassociated.

These conditions and others also met with, more especially in the dog, are varyingly classed by various observers as influenza and distemper ; on what grounds, save as terms of convenience in talking to the public, it is hard to say.

Personally, I think such synonyms are far better reserved for that type of case in which the typical symptoms of the particular disease diagnosed are present ; and it is difficult to know what condition the term influenza represents as applied to the dog and cat and with what special form of the disease as occurring in the human being it is analagous.

Without being unduly pessimistic, I am inclined to think that when the Distemper Research Committee has carried its labours to a successful issue and we are in a position definitely to inoculate against distemper, we shall still be confronted, from time to time, with epidemics which spread by infection. The terms influenza and distemper appear to be, at present, a convenient cloak to cover our ignorance of the true etiology of these conditions.

A Case of Streptococcic Endocarditis in a Pig.

By R. L. Cornell, B.Sc., M.R.C.V.S., Institute of Animal Pathology, Cambridge.

Cases of endocarditis in swine, other than those due to the bacillus of swine erysipelas, appear to be of sufficiently infrequent occurrence to merit this record.

The following case of endocarditis due to a streptococcus was encountered in a pig sent to the Institute for diagnosis. The animal was a fat pig in good condition, and appeared nearly ready for the butcher. On its arrival at Cambridge, the carcase, which had been thirty-six hours in transit, was undergoing some degree of decomposition, and smears of peripheral blood showed a number of anærobic putrefactive bacteria. The autopsy showed the existence of pleurisy at an early stage affecting both pleural sacs, the chest cavity containing approximately two pints of a fairly clear blood-stained fluid, in which floculi and strings of fibrin were present. The lungs were congested but crepitant ; fluid estimated at about 10 ozs. was also present in the abdomen. The lymph glands throughout the carcase were congested.

The pericardial sac contained only a slight excess of fluid, but a thin fibrinous false membrane coated the myocardium, from which it was easily detached practically entire. The pericardium itself appeared thickened and fibrous and the heart muscle paler than normal.

On opening the heart cavities, it was seen that the mitral valve and the aortic cusps were both affected with vegetative growths. Inspection of the mitral lesion showed that the anterior cusp, which lies immediately below and behind the aortic orifice, was more extensively affected than the posterior and smaller cusp. The former was considerably thickened over its entire surface to within about 1.5 to 2 cms. of its border of attachment to the ventricular wall. The free edge of the cusp and the points of attachment to the chordæ tendinæ showed small round white masses varying in size from a pin's head to a millet seed. In some of these bodies calcification had occurred. The posterior cusp was thickened at its free edge, but showed only two of the small white masses, which were situated at the junction of the valve to two chordæ. There was no extensive mass of fibrin deposit so commonly seen in the verrucose endocarditis of swine erysipelas and both cusps of the valve were wrinkled and distorted in shape, due no doubt to shrinkage of the new inflammatory connective tissue in their substance. All the three cusps of the aortic orifice were extensively affected with a deposit of dense yellowish-white material which, when scraped, appeared gritty. This mass of vegetations had reduced the lumen of the ventriculo-aortic opening to at least a quarter of its normal size. On the postero-mesial aspect of the aortic wall and immediately above the affected valve was an irregular star-shaped crater-like ulcer, about 2 mm. deep at its deepest point. The wall of the left ventricle measured 18 cms. in thickness.

Histology of the Valve Lesions.

A small portion from the mitral valve was removed for the preparation of sections. The tissue of the vegetation, was, as is usual in these lesions, composed of a fibrinous material undergoing removal by leucocytes and fibroblasts. A considerable amount of loose connective tissue had been formed which in places appeared fairly dense, with distinct fibrous tissue bundles, though somewhat richly nucleated. This compact tissue merged into a less organised structure considerably vacuolated, while at the periphery a thin layer of fibrin was present. The small pea-like masses contained a central core of well-formed connective tissue surrounded by a layer of fibrinous material infiltrated with inflammatory cells.

In preparations stained by the method of gram, streptococci could be seen to be abundant in the thrombus substance and in places well-formed chains could be made out.

BACTERIAL FINDINGS.

No growth was obtained on media incubated ærobically, seeded from bone marrow and from a bronchial gland. A fragment of spleen pulp smeared on to lactose agar gave about 100 colonies of a lactose fermenting streptococcus. Owing to the fact that a culture was not obtained from the valve lesions, there is no conclusive evidence that the streptococcus obtained from the spleen was the one seen in sections. The fact that a relatively rich growth was obtained in a condition of purity from this organ does, however, point to the identity of the two organisms. The organism obtained from the spleen was a non-hæmolytic streptococcus which fermented, with the production of acid, lactose saccharose, mannite, glucose, maltose, inulin, lævulose and salacin. Dulcite arabinose and glycerine were not affected; acid formation and clotting were produced in litmus milk.

Chronic Metritis in Bitch—Excision of Womb.

By IVAN R. R. COLEMAN, M.R.C.V.S., Swindon.

Case No. I.—*Subject.* A Sealyham bitch, aged 12 years.

When examined, the bitch was in a very advanced state of illness—subnormal temperature, cold body surface, accompanied by the usual symptoms of vaginal discharge, abdominal distension, vomition and thirst. An immediate operation was advised, as the bitch was already in an exhausted condition.

Consent being obtained, the operation was performed after the usual preparation. Owing to the weak state of the heart—the pulse was almost imperceptible—1 m.m. of Liq. strych. in 5 m.m. of normal saline was injected twenty minutes before the operation. A.C.E. was used to produce anæsthesia.

During the operation, collapse occurred, and HCN (Scheele's) m.m. ii. was administered and artificial respiration applied, but without success. Amyl nitrate (m.m. ii.) was then given, the artificial respiration continued, and eventually respirations recommenced.

After the operation, the bitch was in a very exhausted condition and hypodermic injections of æther—m.m. v., were given every three hours.' Diet consisted of Valentine's meat juice—a teaspoonful every three hours. Thirty-six hours after the operation, vomition occurred, and all food was vomited immediately after administration. Milk and soda were then given in equal proportions at regular intervals. This was retained for twenty-four hours, when vomition recommenced.

On the third day, jaundice supervened—no further food was administered, but ℥i. normal saline was given every hour. Temperature 98.4°F. and great depression. The saline was continued until the fifth day, when the jaundice was seen to be disappearing. On the sixth day jaundice had practically disappeared, but temperature was still 98.4° and the bitch was very exhausted. During the evening of the sixth day collapse occurred and death seemed imminent. Pulse was imperceptible and respirations scarcely visible.

Liq. strych. (m.m. ii. in normal saline m.m. x.) was injected hypodermically. Within twenty minutes all the symptoms of strychnine poisoning were exhibited, and persisted for 2½ hours. After the subsidence of these symptoms, the bitch seemed brighter and maintained her condition during the night. On the seventh day a distinct improvement was noticeable and each subsequent day showed still further improvement—all food was retained and she became stronger and brighter each day, and gave no further trouble excepting with the external stitches, some of which were torn out after the injection of strychnine on the sixth day. She was discharged perfectly fit on the twenty-sixth day.

I enclose photograph of uterus after excision and which contained ℥xv. of pus.

What was the cause of the onset of jaundice—was it due to æther saturation or the amyl nitrate?

The symptoms exhibited after the injection of strychnine on the sixth day I think were very unusual, in view of the fact that the bitch was partially *in extremis*.

Case No. II.—About a month later I was called in by a friend of the owner of the above bitch to see another Sealyham, aged 13 years, suffering from the same condition.

Owing to the precarious state of health of the owner at the time, his wife would not consent to an operation, as the bitch was his special pet. Accordingly, internal antiseptics were given and irrigation of the womb attempted, but no improvement took place. This was continued for a week, then all medicines and injections were stopped and the bitch was put on a course of polyglandular tabloids, containing:—

Thyroid Gland	1/10 gr.	dessicated gland
Pituitary Gland (whole yld.)	1/20 gr.	„ „
Ovarian „	¼ gr.	„ „
Orchitic „	¼ gr.	„ „

—two tabloids were given three times daily.

After a week's treatment, the discharge became less and was not so offensive. Vomition ceased and the abdominal distension was markedly less. The treatment was continued another fortnight, and the bitch then appeared perfectly normal. All symptoms had disappeared and appetite was good and spirits excellent.

The only symptom which persists is a craving for water, which, as it does not appear to hurt her, she is allowed to have. She has now been enjoying perfectly good health for over six weeks.

The tabloids are still administered, but have been reduced to three tabloids every second day.

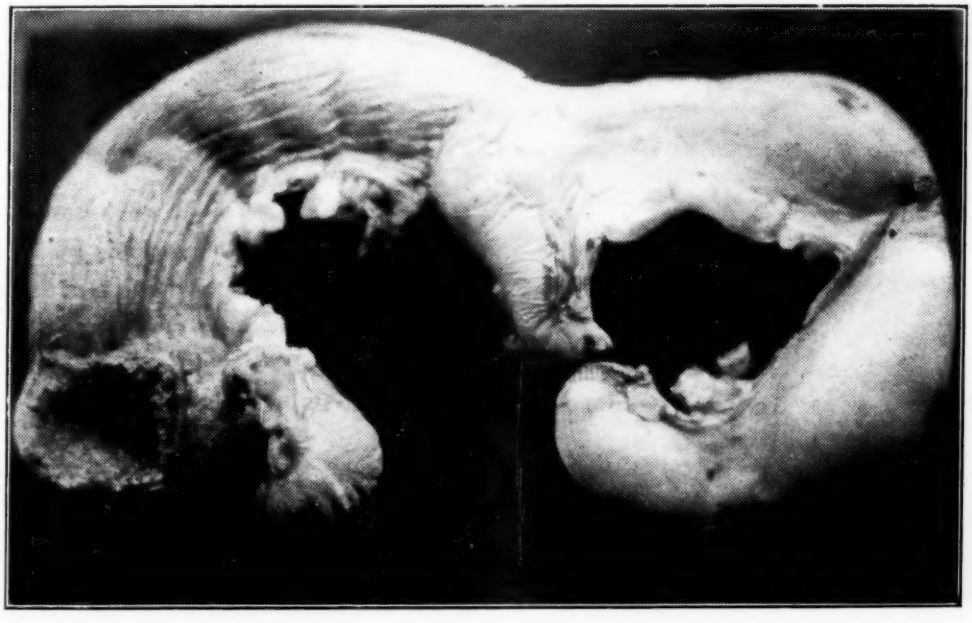
At the last meeting of the Western Counties' Division, N.V.M.A., amongst other matters discussed was the giving of free advice on the treatment of animals of poor people (which advice, points out the *Torbay Herald*, has been freely given in the past by many veterinary surgeons).

It was unanimously decided to give such advice in approved cases, such cases to be vouched for by a note of hand from the local inspector of the Royal Society for the Prevention of Cruelty to Animals or from a Chief Constable or Inspector of Police.

Left ventricle showing the mitral valve.

Aorta viewed from above. The arrow indicates the ulceration of the aortic wall.

To Illustrate Mr. Cornell's Case.



To Illustrate Mr. Coleman's First Case.

ABSTRACTS.

Treatment of Distemper Paraplegia with Intra-rachidial Injections of Iodo-benzomethylformine.

R. Taillandier uses a 10 per cent. solution which he injects between the sixth and seventh lumbar vertebræ. After the injection he raises the hinder parts above the level of the fore parts so that the solution may gravitate towards the anterior parts of the arachnoidal space. The doses he uses are 50 cg. every third day. These intra-rachidial injections may be alternated with 5 cubic cm. intravenous injections.

In seven cases treated by this method the author always obtained progressive improvement. If treatment was interrupted the symptoms remained stationary. [*Thesis for Doctorate, Paris* 1927. Ex *Rec. Méd. Vét.*, 15 Fev. 1927).

(*Note by translator.* Ah! the expectant treatment usually shows similar results. Patience with such patients is a great virtue).

H. G.

A Contraindication to the Administration of Digitalis.

L. Gallavardin (*Presse Med.*, December 29th, 1926, p. 1637) refers to the uncertainty about the action of digitalis in diseases of the heart, sudden death having followed its ill-timed administration These fatalities do not depend solely on the size of the dose or its method of administration, but are related to the condition of the heart. While even very large doses do not affect the healthy heart, the smallest dose will sometimes cause grave trouble in cardiac disease. Gallavardin states that sudden death after digitalis administration is caused by ventricular fibrillation. Auricular fibrillation is common and is well borne, but ventricular fibrillation inevitably leads to cardiac syncope or sudden death, and the author believes that a rhythmic syndrome, termed by him the "syndrome of alarm," exists which can be considered an expression of a prefibrillatory state of the ventricle. This syndrome, which can be easily detected by careful examination, is aggravated by even very small doses of digitalis. It consists of three marked symptoms—double rhythm, extra-systolic salvos, and attacks of tachycardia. The presence of these signs, Gallavardin maintains, should make physicians extremely prudent in the use of digitalis.

British Medical Journal.

Chemistry of some Animal Fluids. Abstracted from Pfluger's *Archives*, 1926, Vol. 213.

1. The Hydrogen Ion Concentration of the contents of the

Rumen of the ox =8.89 (Gabriel, F. p. 814).
Omasum of the ox =7.187 (Stremnitzer, L.,p.587).
Abomasum of the ox =2.036 to 4.141, measured by the hydrogen electrode. Free HCl absent when tested with Congo red and with di-methyl-amido-azo-benzene. (Kaplan, p. 592).

2. Horse's sweat :—

P.H. =8.527 to 8.564 in well kept horses.
8.377 in less well kept horses (Korkish H., p. 539).
Protein content =2.75% on average.
Urea content =0.14% on average (Ritter. H., p.544).

DIVISIONAL REPORTS.

Central Division.

The presentation of a paper by Capt. F. C. Minett on "Researches on Foot-and-Mouth Disease" drew a large number of Fellows and "Class D" students to a meeting of this Division, which was held at the Royal Veterinary College on the evening of Thursday, March 3rd, 1926. The paper gained in interest from the fact that at the time of its presentation the Second Progress Report of the Foot-and-Mouth Disease Research Committee had just received publication.

In the absence, through indisposition, of the President (Major G. W. Dunkin), the Chair was occupied by Major-General Sir John Moore, and there were also present Dr. W. H. Andrews, Mr. H. Bell, Capt. R. Bennett, Messrs. W. Brown and H. E. Bywater, Capt. D. Reid Chalmers, Capt. A. Ross Grant, Major F. T. G. Hobday, Messrs. H. D. Jones and Herbert King, Major H. Kirk, Professor J. McCunn, Messrs. J. W. McIntosh and W. Perryman, Capt. E. B. Reynolds, Lt.-Col. P. J. Simpson, Professor A. R. Smythe, Mr. J. Stephens, Capt. R. J. Stow, Capt. W. K. Townson, Mr. J. Willett and Mr. J. F. Macdonald, Hon. Secretary.

Visitors: Messrs. S. E. B. Balfour-Jones, J. H. Bennett, L. W. Bovett, J. L. Buckingham, B. A. Claxton, W. J. Cooper, L. W. Coulden, D. C. S. Danby, A. C. Dixon, J. A. de Garis, D. M. Hale, H. Hedley, A. J. James, Major R. H. Knowles, A. A. Mackay, A. B. MacIntyre, Dr. H. B. Maitland, A. Messervy, E. Messervy, A. B. Orr, E. Pratt, H. S. Purchase, W. J. Radford, Dr. A. L. Sheather, A. W. Stableforth, J. S. Steward, P. G. M. Thompson, Major R. F. Wall, Messrs. E. A. Webb, J. B. White and C. E. Woodrow.

The *Minutes* of the January meeting of the Division, having been published in the *Record*, were taken as read and were signed as correct.

Correspondence: (1) From Professor Buxton and Messrs. Slocock and Stroud, apologising for absence. (2) From Capt. S. J. Motton, of Penzance, requesting the Secretary to convey his thanks to the Fellows for the very pleasant time which he had been enabled to spend with them on the occasion of their last meeting, at which he read a paper.

(3) From the Secretary of the N.V.M.A., acknowledging the receipt of the resolution forwarded, following its adoption by the Division, on the subject of the Control of Reactors to the Tuberculin Test.

Nomination: Major R. F. Wall, of Bayswater, was nominated as a Fellow of the Division.

Election: Capt. D. Reid Chalmers, of Tunbridge Wells, was elected to Fellowship.

Morbid Specimens and Cases of Interest.

Professor J. McCunn: I have one or two specimens to show you which I hope will interest you. The first is that of a foal's head, showing malformation and hydrocephalus. This was sent to Sir J. M'Fadyean

by Mr. John Ridley, of Beverley, Yorks. The mare has had three living perfectly formed foals. The foaling was difficult but was successfully accomplished by Mr. Ridley, and the mare progressed favourably. (The exhibitor read a letter, descriptive of the case, which had been received from Mr. Ridley.)

The second exhibit is that of an abnormal young pig. This was brought to the Anatomy Department by Professor Wooldridge, and was one of a litter. It has not been ascertained as yet if the animal lived as the lungs have not been examined. It is apparently a female. The peculiarities are as follows: It has a well-defined, mesially-placed trunk placed on the forehead with a single terminal external naris. There are three well-formed teeth in the upper jaw, two in the position of the canines and one in the position of the central incisors. There is a mass resembling a fœtal eye, or eyes, placed slightly to the right of the median line. The tongue has fibrinated edges. One ear is present on the left side, also a process on the right in the position of the right external ear. This process is anterior to an opening—apparently the external auditory meatus. The right fore limb has five well-formed distinct toes. There are a few long coarse hairs on the face.

I have here, as my third specimen, the teeth and hoofs of a horse reported to be 45 years old. The feet are 16¼ inches long, tremendously overgrown, having grown in a curved fashion with the distal extremity pointing upwards and recurved. The frog has completely atrophied. The history is that the pony belonged to an Irish gentleman who had it 20 years. In his will he left instructions that it was to be turned out in a certain place and pensioned. It lived for 25 years thus. I am unable to verify the age from the teeth and probably some Fellow present can do so.

Major F. HOBDAY: I had an interesting specimen brought to me by Mr. L. Sewell. It is that of the bladder of a Golden Cocker Spaniel, only five weeks' old, the orifice of which was entirely blocked by sabulous material. The interesting part about the case is the age of the subject: I have never previously met with so young a dog with sand in the bladder. The animal had died and the body was exhumed for the purpose of examination. The bladder was very much distended; when it was excised about two ounces of water came away.

Capt. R. J. STOW: I have brought this specimen—the pericardium of a 20 months' old heifer. The only history I have is that I was summoned one morning to see the heifer, which was down and could not get up. When I arrived, however, she was standing and the only thing I could discover to be amiss was that she was slightly constipated. Three weeks later she went down and was showing signs of brain trouble. She died that day. The following day I called in at the knacker's yard, and he showed me this. The pericardium shows a tremendous mass of tuberculous growth. Beyond the tuberculous pericarditis I could find few sites affected with the disease. The lungs seemed hardly affected at all. This pericardium weighs from 7—8 lbs.

Dr. LESLIE SHEATHER: May I, as a visitor, make a few remarks? With regard to the pig with the peculiar trunk-like formation, that is a common form of abnormality in all species of animals which suffer from this type of defect. I have seen it in pigs, foals, and calves. In the so-called "cyclops" abnormality, although there is only one central eye, as a rule there are really two joined together. The eyelids often show indications of this.

Major HOBDAY: Professor McCunn's third exhibit reminds me that I have a specimen of the incisor teeth of a horse that was known to be 42 years old. It served all through the Boer War and died eventually, as the result of an injection of horse sickness virus, at Grahamstown, in South Africa.

The CHAIRMAN: I think that these instances of the attainment of great age in horses raise a very interesting and a very important question, namely, to what ages have animals been known to attain, or can they attain, under working or other conditions. I remember when I began the practice of my profession, reading—somewhere in the early eighties—in *The Veterinarian*, of a horse that lived to the age of 60 years, and, so far as I remember, there was a photograph of the teeth. It would be an interesting thing if someone would look up their files of the *Veterinarian* and confirm that. I do remember a pony, belonging to a relative of mine, which attained the age of 40 years.

Capt. E. B. REYNOLDS: In regard to this question of the age to which horses do live sometimes, I myself had knowledge of a cob which was supposed to be 45 when it died (they could not tell with certainty to two or three years) and up to that time it was still at work. To how many years it would have lived it would be difficult to say, because it died through getting out into a field of second crop clover that was very wet at the time, and succumbed to bowel trouble. This animal was ridden six or seven miles a day, and three generations of the family rode it, two of them learning to ride on it.

Capt. W. K. TOWNSON: I destroyed one of the ponies of the late F. W. Garnett, and that was supposed to be 40 years old. Prior to its destruction, the pony appeared to be perfectly sound and was going well.

A Member said that he remembered reading that the New Forest ponies often lived to a very great age, and in the Natural History Museum at South Kensington there were interesting specimens of the teeth of ponies of various ages.

Professor MCCUNN remarked that he remembered that his father had a mare which had a foal at the age of 26 years. That introduced another interesting feature in regard to age.

ANY OTHER BUSINESS.

Major G. REES-MOGG: I would like to make the suggestion that when papers are going to be read a fixed hour should be arranged for them to start. My reason for making this suggestion is that at the last meeting, Mr. Motton, who had to travel 300 miles, and gave us a most interesting paper, for various

reasons could not commence reading it until 8-30. The consequence was that half the members left before he had finished and the discussion was practically *nil*. It is not even polite for the Society to ask a man to come that distance, to take the vast amount of trouble that the preparation of such a paper must have entailed, and then for half the members to leave, even before the paper had been read (it was not their fault—they had trains to catch) with the result that the discussion is ruined. I wish to suggest that, irrespective of the stage at which the programme has arrived, we fix a certain hour at which the reading of the paper must commence.

The CHAIRMAN: In regard to this suggestion, I think I should say that the great feature of our meetings is the presentation of morbid specimens and interesting cases, and that necessarily takes up a good deal of time. To-night, as it happens, there has not been much discussion and we can get on with the paper almost immediately. But I do, nevertheless, agree with Major Rees-Mogg that it would be wise to fix a time at which the reading of papers should commence. We might devote, say, three-quarters of an hour to the general business and morbid specimens and then make way for the essayist. Another way of surmounting the difficulty would be to have the papers circulated to the members before the meeting.

After further discussion the following resolution was carried: "That the Council be asked to consider the question of the inadequacy of the time which is often allotted to the reading and discussion of papers."

The Chairman then called upon Capt. F. C. MINETT to present his paper, entitled: "Researches on Foot-and Mouth Disease." [Capt. Minett's paper, and the discussion which ensued, receive separate publication in this issue of the *Record*.—Ed.].

At the conclusion of the discussion, which was well sustained, hearty votes of thanks were passed to the essayist, to the opener of the discussion, and to those who presented morbid specimens. The proceedings terminated with a similar tribute to Sir John Moore for his conduct of the meeting.

J. F. MACDONALD,
Hon. Secretary.

Lincolnshire and District Division.

ANNUAL MEETING AT GRANTHAM.

VALUABLE DEMONSTRATION BY DR. SHEATHER.

A most encouraging revival of interest in the affairs of this Division was evidenced on the occasion of the Annual Meeting which was held at the George Hotel, Grantham, on Thursday, February 17th, 1927, and at which the President, Mr. H. C. Reeks, Senr., was supported by a gratifying number of members. The officers were fortunate in securing for the occasion the services of Dr. A. L. Sheather, of the Camden Town Research Institute, who gave a demonstration of great interest and value to general practitioners in such an agricultural area, *viz.*, "The Diagnosis of Parasitic Infestations by Examination of the Fæces." In addition to those mentioned, there were present Messrs. T. B. Bindloss, W. A. Dickinson, J. A. French, C. Hartley, T. Hicks, A. J. Hines, W. J. Ironside, T. J. Keall, T. Knowles, G. D. Lalor, W. W. Lang, G. Lockwood, J. K. Poles, E. Porter-Smith, F. H. Sugden and H. Walpole, together with the Hon. Secretary, Mr. H. C. Reeks, junr. *Visitors:* Messrs. E. F. Angler (Doncaster) and J. S. S. Woodrow (Goole).

Apologies for absence were sent by Messrs. J. Caldwell, J. T. Holmes, R. G. Nurse, J. Runciman, T. Runciman, H. P. Standley, C. W. Townsend, E. Wardrop and A. Williams.

At the outset, the PRESIDENT expressed the keen pleasure which it gave him to see such an excellent attendance of members, particularly as their meetings had been rather poorly attended of late. He wished to thank them for rallying round him again and he earnestly hoped that the improvement in attendance would be maintained.

Correspondence.—A letter was read from the Secretary of the N.V.M.A. inviting the Division to express, for the information of the Council of the Association, its opinion upon the following points: (i) Whether the time has arrived for the control of reactors to the tuberculin test, and (ii) If so, what form that control should take.

The PRESIDENT having requested members to voice their views on the first point, Mr. HICKS said it was rather difficult for them to say anything, in view of the attitude of the various County Councils towards the application of the tuberculin test. It was only in extreme cases that they would allow them to apply it, for their chief concern appeared to be that it should not be too extensively employed. That being the case, the value of any measure of control would be very small; for that to be effective the employment of the test would have to be universal.

The PRESIDENT remarked that the question affected them very much as to whether the reacting cows should be allowed to go on the market without restraint or whether they, as veterinary surgeons, should advocate some measures of control over them.

Mr. LANG thought they would all agree that something should be done, but whether the time was ripe was another question. They must remember that, for any useful action to be taken, they must have the support of the owners of the animals, but at the present time he feared they would not have it.

After some further discussion, in which it was pointed out that some form of branding of the reacting animals would be necessary, which it was felt would not be tolerated by the farmers, who would refuse to have their animals tested, the following motion was carried: "That while this Division is quite in sympathy in principle with the suggestion that some control should be exercised over cows reacting to the tuberculin test, it does not think that any form of control is practicable at the present time."

In consequence of the passing of the fore-going resolution, consideration of the second point in the letter from the N.V.M.A. did not arise.

ELECTION OF OFFICERS.

President: Mr. F. L. Gooch.

In proposing, from the Chair, the election of Mr. Gooch, Mr. CAULTON REEKS said that it gave him great pleasure to exercise the privilege of nominating, as his successor in office, his friend Mr. Gooch, who had been one of the most regular attenders at their meetings and had always taken a very great interest in the proceedings and in the welfare of the Division. He regretted to say that Mr. Gooch was prevented from being with them that day as he had found it necessary to visit a hydro in consequence of a severe attack of lumbago. He (Mr. Reeks) had no doubt that Mr. Gooch would be willing to accept the office, if elected.

Mr. LANG seconded the proposition, paying a tribute to the enthusiasm with which Mr. Gooch had worked in the interests of the Division.

The election was made with acclamation.

Vice-Presidents: The retiring President, Mr. W. W. Lang and Mr. Porter-Smith.

Hon. Secretary and Treasurer: Mr. H. C. Reeks, junr. In proposing the re-election of Mr. Harry Reeks, Mr. Hicks said it was the unanimous wish that Mr. Reeks should continue in the offices, the work of which he carried out with such ability and success.

ANY OTHER BUSINESS.

Under this heading, Mr. Lang drew the attention of the members to a matter in which, he said, they were all keenly interested—the recent lawsuit at Market Rasen, where the point at issue was a service agreement. It appeared that the agreement was that Mr. Scotson, the defendant, should not practice within twenty miles of Market Rasen. Mr. C. H. Porter had been in practice at Market Rasen for some time and, on account of health, he had to have a locum. Defendant came in that capacity and carried on for a considerable period, being under the bond of agreement not to start practice within twenty miles of Market Rasen. Upon leaving the employment of Mr. Porter, however, the defendant did so. The case came into the courts, which decided that the twenty miles radius was not in the interests of the public, and gave judgment against Mr. Porter. From the practitioner's point of view, he thought they ought to know what established a valid agreement.

It was decided to request the National to secure for the Division a legal ruling as to the validity of radius and time agreements.

THE DIAGNOSIS OF PARASITIC INFESTATIONS BY EXAMINATION OF THE FÆCES.

The PRESIDENT in introducing Dr. Sheather, expressed the gratitude which he said they all felt to him for coming from London to give them a demonstration which he was sure would be of the greatest value to them in their everyday work.

Mr. A. L. SHEATHER, D.Sc., M.R.C.V.S., who was received with applause, said that he felt that he must apologise to the meeting for showing them something of which accounts had already been published, but he had come down at the urgent request of their President as a stop gap and there had not been time to prepare a special paper. He trusted, however, that they would derive some benefit from his demonstration.

The original account of the work appeared in the *Journal of Comparative Pathology* for June and December in 1923, and a further description had appeared in the *Veterinary Record* of June 28th, 1924 (Vol. IV., No. 26, page 553), in connection with a Meeting of the Southern Counties Division at 10 Red Lion Square, London, on March 27th, 1924. Members who wished to try the method would be able, therefore, to get the full details.

The aim of all methods devised for the purpose of examining fæces for the presence of worm eggs is to get them free from fæcal debris, continued Dr. Sheather.

The earlier investigators of the problem were principally concerned with the examination of human fæces for the presence of ankylostome eggs, and little has been written regarding the detection of eggs in the fæces of animals.

The principle upon which the method to be described is based, namely the use of a liquid with a specific gravity greater than that of the eggs, appears to have been first applied by Bass in 1906. This author first used a concentrated solution of sodium chloride and subsequently of calcium chloride, and also advised the use of the centrifuge for the acceleration of the rise of the eggs to the top of the liquid. Since that date a number of workers have described techniques varying in one or more details and employing various liquids for the purpose. These need not be detailed.

In the course of my own experiments a large number of solutions were tried before one suitable for use with fæces from different species of animals was hit upon. That finally selected was a simple solution of sugar in water having a specific gravity of about 1,200. The proportions necessary for this are one gramme to one c.c. (or 1lb. in ¾ pint).

The fæces are not mixed directly with this solution. They are first broken down with a sufficient amount of water to make a suspension which is as fluid as water itself or nearly so. It is found in practice that the fæces of cattle and horses are the most easily diluted. Those of pig and sheep come next and those of the dog and cat are the most difficult.

The diluted fæces are passed through a wire gauze sieve which has some thirty meshes to the linear inch. The process of straining is greatly accelerated if the suspension of fæces in the sieve is stirred. This prevents a matting of the coarser vegetable debris on the gauze and allows a freer passage of the liquid with the finer particles and the eggs. After straining, the liquid obtained has added to it an equal amount of the solution of sugar and the tube is inverted

three or four times to ensure mixing. This mixture is then poured into a centrifuge tube and the machine is run at about 2,000 revolutions for a couple of minutes or so. It is important to note that the centrifuge tubes should not be filled quite to the brim for there is a little risk of the top layer of the liquid being lost if that is done. If an electrically driven machine, or one driven by water, is available so much the better, but the requisite speed can be obtained quite easily with a hand centrifuge.

The effect of the centrifuging is to bring the eggs of nematode worms (and occasionally cestode eggs) to the surface of the liquid. The trematode eggs are *not* brought to the surface, apparently because the sugar solution gains access to the interior and so increases their specific gravity. They are to be found, if present, in the sediment.

If eggs are present in sufficiently large numbers —that is to say, some thousands—they can be seen floating at the surface of the liquid, as a thin whitish scum, with the naked eye.

Having thus collected the eggs at the surface of the liquid the next step is to get them transferred to a slide for microscopic examination. In the past a number of means to this end have been suggested, such as fine pipettes, glass rods, loops of wire and so on. These, however, are not satisfactory and it was felt that if possible the eggs should be collected on the cover glass itself. The difficulty was to devise a method of manipulating the coverglass in such a manner as to achieve this. After a number of trials it was found that this could readily be done by means of a little "beak" of plasticene attached to the end of a piece of wood, such as a pen holder, or a piece of glass rod or tubing. The plasticene "beak" should be about three-quarters of an inch long and bent at right angles to the handle. The coverglasses used are preferably thick ones (No. 3) as these are less liable to breakage and the traces of plasticene which adhere to the glass are more out of focus when the specimen is being examined and consequently obstruct the view less. The coverglasses must be of such size that they will readily enter the mouth of the centrifuge tubes, but they should approximate as nearly as possible to the size of the tube as otherwise the maximum number of eggs will not be collected. For the ordinary conical tubes of the hand centrifuge half-inch glasses serve very well.

A coverglass is laid flat on the table and by gentle pressure the tip of the plasticene is caused to adhere to its centre. The glass is then lifted and lowered down on to the surface of the liquid in the centrifuge tube. It must not be submerged. With a slight tilt the glass is then lifted again and with a little traction between the finger and thumb of the left hand it is dropped on to the centre of a slide. If the process has been carried out properly, and this refers especially to the slight tilt in withdrawing the coverglass from the surface of the liquid, the amount of liquid clinging to it will be just sufficient to fill the space between it and the slide without any running out round the edge.

The specimen is then ready for examination under the microscope. While it is not possible to distinguish between the eggs of Hæmonchus, Trichostrongylus, and Ostertagia—the genera responsible for parasitic gastritis—these can be distinguished from the eggs belonging to the worms responsible for parasitic bronchitis and pneumonia, from those of Nematodirus, Trichurus, Ascaris, and the cestodes. The last of these are not as a rule encountered scattered among the intestinal contents, the ripe segments being passed out intact, but they are occasionally so found.

In the course of the observations connected with parasitic gastritis it was noticed that forage acari were not infrequently encountered and this gave one the idea that the method might be applied to the diagnosis of mange. Clearly, the suspected material would have to undergo preliminary treatment to get rid of the crusts, scabs, greasy material, hair, etc. It had been found before that mange parasites will withstand boiling in 20 per cent. caustic potash for several minutes without being damaged, and in treating skin scrapings the following modification is incorporated in the method. The scrapings are boiled in 20 per cent. caustic potash until all (or most) of the crusts, etc., have been dissolved. This does not, as a rule, require more than three or four minutes. It may be mentioned here that the provision of a wire gauze "jacket" enclosing the tube during the process of boiling greatly reduces the risk of breakage. When the crusts are dissolved the liquid is centrifuged for a few seconds. This suffices to throw the mange parasites to the bottom of the tube. The caustic potash is poured away and the tube is half filled with water. Then sugar solution is added, and, after mixing, the centrifuge is run again just as in the collection of worm eggs. The mange parasites are collected on the coverglass as before. In this way perfectly clean preparations containing the acari only may be obtained. In this way a definite diagnosis can be arrived at in at the most ten minutes and often in less than five.

It should have been mentioned that the process as applied to the detection of worm eggs is also effective for the detection of coccidia. From experience gained, it would appear that coccidiosis is more common in dogs than has been thought, but it would appear that the presence of coccidia in small numbers in the fæces of any of the domesticated animals must not be taken as evidence that they are responsible for any degree of ill health. Further, it seems to be a fact that dogs infected with coccidia do not pass the parasites in the fæces constantly.

Dr. Sheather then proceeded to demonstrate to the meeting the method described, as applied both to the detection of worm eggs and of mange parasites. He expressed his indebtedness to the President for having provided the microscopes.

The PRESIDENT: I am confident that you will agree with me when I say that our expectations of an interesting and an informative demonstration from Dr. Sheather have been more than fulfilled (hear,

(*Continued at foot of first column, next page.*)

Scottish Metropolitan Division.*

The Control of Reacting Cows.

A Special Meeting of this Division was held on Wednesday, 16th February, 1927, to consider the circular letter from the N.V.M.A. regarding the control of cows reacting to the Tuberculin Test.

Professor R. G. Linton—the President—occupied the Chair.

The Secretary read extracts from the Minutes of the Meeting held on 27th January, 1927, and, after dealing with the apologies for absence, read letters expressing the views of some of the Members who were unable to be present. The President said that they had all received copies of the letter which was received from the Secretary of the "National," and without further introduction he would declare the meeting open for discussion.

Mr. Hugh Begg, F.R.C.V.S. (County Veterinary Inspector for Lanarkshire) Hamilton, said: In acceding to your kind invitation to open a discussion here to-day on the control of cows that have reacted to the tuberculin tests, I innocently undertook a task of which the difficulty was only revealed when I attempted its serious consideration.

It will be your desire that we should keep close contact in the discussion with the two questions contained in the circular letter of the Council of the National Veterinary Medical Association, *viz.*:—

"(*a*) Whether the time has arrived for exercising some form of control over cows that have reacted to the tuberculin tests"; and,

"(*b*) If so, what form that control should take, and how far it is practicable at the present time."

Each of these problems is of prime importance and offers much scope for the clear vision of a better dreamer than I can claim to be. It would almost appear that the consideration of the second question is entirely contingent on an affirmative reply being given to the first one, and yet it is obvious that any answer to the first question must in great measure depend on the interpretation you put on the word "control."

In the absence of state aid, which we would all welcome and which would enable the complete control and immediate disposal by slaughter of reactors under compensation—a control which in the rather distant future might be afforded under a last extension of the Tuberculosis Order not yet contemplatable—we are forced to think of control as applying mainly to the surreptitious disposal of, and objectionable trafficking in, cows that have reacted. This question looms up more and more as the years—the very months—go by, and the problem becomes ever more acute, for the use of tuberculin has increased enormously in certain districts in recent days. I believe that more tuberculin has been used in the past four years than in the previous twenty years, and with the certain prospect of its still greater use in the near future, the corresponding increase in the number of animals to be discarded from herds paving the way to a tubercle free condition, lends a progressively-increasing importance to this vital problem. Very soon the buyer's chance of purchasing in an ordinary public mart an aged dairy cow that is non-tuberculous will be considerably reduced.

It is worthy of note that, meantime, the only legislative control over reactors which we possess is under the Milk (Special Designations) Orders, and in relation to herds licenced thereunder, as you are aware, no licencee for the production of "Certified," "Grade A (tuberculin-tested)," or even "Grade A" milk is allowed to retain in his herd or on the premises to which the licence applies any animal which has reacted, nor may a "Grade A" licencee add to his herd any cow that is known to have reacted, despite the possibility that his untested herd, if tried out, would be found to contain a large percentage of reactors. This restriction on the "Grade A" licencee prohibiting the entrance into, or retention in, his herd of any animal that has failed to the test, demands the subtle and tactful consideration of all who aspire to some form of grading. The possessor of an untested herd who fears to face the application of the test may successfully apply for and retain a "Grade A" licence, provided his premises, methods and equipment, pass muster. But if, initially, he had a higher ambition, and essayed the tuberculin testing of his herd in an attempt to secure a "Certified" or "Grade A. (tuberculin-tested)" licence and got a result in reactors that he regarded as prohibitive of his original design, he would find that his own very laudable act had barred the door of success to any subsequent application for the lower "Grade A" licence so long as his herd contained any known reactors. It is something of an anachronism that a "Grade A" herd may contain many animals that would fail to the test but must not harbour one known reactor.

In trying to envisage any phase of practicable control over the reacting cow, we do necessarily come up against the vexed problem of the control of tuberculin itself. Probably every practising veterinary surgeon and certainly every stock-owner who brings to his business a high moral standard, is heartily in favour of controlling the sale and use of tuberculin, and the failure of successive Governments to pass the necessary legislation, illustrates very vividly the Britisher's reluctance to interfere without extreme cause with the liberty of the people. Though its iniquitous and underhand use by interested people is common knowledge, nothing has been done, but fortunately one of the wings of this bird of ill-omen has been lopped off by the detective efficiency of the intra-dermal test, which can reveal the reactor in the faked animal so clandestinely saturated with tuberculin that for a time it will yield no thermal reaction to the subcutaneous test. But the other wing remains, for whether tested privately by a cunning owner or a veterinary surgeon honourably seeking the truth, a reactor is still a reactor, and herein lies the greatest difficulty in reference to control of reactors, and the meaning we are to attach to it. The control of tuberculin as if it were a poison by making its use illegal except in the hands of qualified men, who would be required to keep a record of all testing done by them, would therefore enormously hasten and simplify the road to the control of the reacting animal itself, when the time for such action was considered opportune. I submit, therefore, that these two issues are inextricably interwoven, nor need we entertain any prospect of complete control over reacting animals, until the use of tuberculin is properly limited.

But, if we could set out a compelling plea for some degree of control over the reactor, we might thereby successfully involve again the older question of the control of tuberculin. At this point, and for the reasons stated, we might end the consideration of the problems set, and devise a new campaign for the removal of a stumbling

(*Continued from prevous page.*)

hear). Our very best thanks are due to him for so kindly stepping into the breach created by the inability to find one of our members to read a paper at this meeting, and for giving us a demonstration which has not only been very interesting but which will prove extremely useful to us all.

The meeting accorded Dr. Sheather a most enthusiastic vote of thanks, which was acknowledged by the demonstrator in suitable terms. The meeting concluded in the passing of a hearty vote of thanks to the retiring President, Mr. Reeks, for his conduct of the meetings during the past two years. Mr. Lang, in proposing, said that all would agree that Mr. Reeks was well worthy of all the thanks they could give him.

H. C. Reeks, Junr., *Hon. Secretary.*

* Received on February 23rd.

block so potent. In my view, that is the first step that should be taken, but to ensure a wider basis of debate, I will pass on to deal with a few other points.

Let us consider briefly the sources and present destinies of reacting animals, and whether an intending purchaser may find it possible to make wise selection between reacting cows offered for sale. They are available in considerable numbers from herds, tested perhaps for the first time, that have shown a high percentage of failures, and whose owners are determined to have a tubercle-free lot as soon as possible and despite the irksomeness of the situation. The extent to which such animals are diseased may vary exceedingly, and some may be markedly tuberculous. It would be a great boon to all concerned, if the degree of reaction were in any sense a measure of the extent of disease in the tested animal. In most cases the owners, in order to get out of them on the best terms, only offer them for sale in driblets when they come into bloom and are due to calve again, or, according to the season, they may sell them as spring or back-end calvers. Reactors in milk and recently calved may be sold at once, but it is not often that they are mated again, the usual practice being to milk them till dry and then fatten for slaughter. Reactors sold as dairy cows are dealt in privately or put up to auction with or without a declaration regarding the test.

Herds that have had several reactors to the first test and have got rid of them, usually provide one or more reactors to the second, third or perhaps the fourth test, applied six-monthly, through having experienced some degree of exposure to infection, and whether licenced or not the owner gets rid of them at once. Being presumably only recently infected, these later reactors are likely to prove quite useful purchases for the owners of untested commercial herds who fatten off their dry cows or keep them for not more than two seasons. If a graded herd be self-supporting, as the great majority are, a clean sheet is often secured within two years.

A reactor in remote exceptional cases is sometimes revealed in a herd that has been graded for some years and has successfully passed several successive tests In three or four such cases with which I have met, the owners have thought fit to slaughter at once at their own risk to see whether the *post-mortem* examination would prove the correctness of the test result. In each case the tuberculous lesions found have been very minute, and the culprit has usually been a young animal tested for the first time that may have been exposed to infection at grass through straying, or perchance is one bought in as a calf when a few days old—the get of some special cow in a neighbour's herd. For example, a farmer who had a self-supporting herd (never having bought in a cow for many years and taking care to purchase only tubercle-free bulls), got his herd tested by his veterinary surgeon. Every animal stood the tests, about eighty in all. A few months later he applied for a licence for the production of "Grade A (tuberculin-tested)" milk, and all the animals passed our first official test. Six months later, expecting to get a clean sheet again and that the herd would graduate for yearly testing in terms of the Order, I asked him to tie up for inclusion in the test then due all heifers that would come into lactation within twelve months. One unmated heifer two years old reacted badly, but the owner had a ready explanation. She had been bought from a neighbour when four days old, and the presumption was that it had got infected milk before it left its place of birth. This story is adorned by the moral is carries.

Again, we know of very many cases wherein ambitious owners of herds composed in great measure of market-bought animals got such a shock from the result of a first try-out that they at once decided to do no more testing meantime, and of these a few have adopted protective vaccination of their calves. Such cows kept on in the herd for indefinite periods of time must provide loss from tuberculosis to the owner and must be dangerous animals to buy, if and when they are sold, and the owner usually buys and sells as if his herd had never been tested. When reacting cows are fattened off, there is no objection from the milk point of view, but the purchasing butcher has a right to regard it in a different light. The odd reactor in milk in a graded herd is often sold, privately and at some loss, to a neighbour who owns a commercial herd and who knows what he is purchasing. Again, as I have said, reactors may be sold at a public mart (as most of them are) either (*a*) as declared reactors, which puts no reproach on the seller, although susceptible of criticism from the point of view of the spread of disease, or (*b*) without declaration, so that the unwitting purchaser gets a proved reactor instead of a problematic one.

When reactors are sold for what they are, privately, the buyer usually gets them on easy terms, but, contrary to the generally-expressed opinion, I cannot say I have noticed declared reactors to suffer much, if at all, in their selling price at public auction, everything else being equal. Moreover, in the case of the individual who has many to dispose of and contrives to sell reactors week by week without declaration, the news gets noised abroad, his conduct is resented, and I believe he experiences a worse market than the conscientious man, and that perhaps in some degree because the latter is probably selling a cow that has only recently become a reactor, and the purchasing public seem to realise in a subconscious way the greater value of his animal. It is in the nature of all of us to repay candour and to resent being made the dupe of another man's unclean machinations, and to have become the unwary custodian of a discarded cow clandestinely sold because it was a reactor, or for some other serious fault, is subversive of goodwill and causes a rankling sore that begets the desire to have the law changed.

We possess no statutory power to set any kind of seal on animals that have failed the test, nor are we likely to get it in the near future. Indeed, if this were enacted I believe it would seriously retard the progress of the present pronounced movement in the trying-out of herds with tuberculin, and that could only be regarded as a calamity. But if it be competent to deny the addition of an apparently healthy and good-looking but reacting cow to an untested "Grade A" herd, I see no reason why it should not be made illegal to sell a reacting cow without declaration. I would vote for this wholeheartedly and return this modified answer to both questions if we could encompass the control of tuberculin. Even if this operated to reduce the selling price of reactors by ten per cent. we cannot forget that the seller would secure a *quid pro quo* in the enhanced value of the animals retained in his herd which have stood the test, and he would have no ground for complaint. Their value would be appreciated whether he kept them for the supply of tubercle-free milk, sold them as dairy cows, or indeed as fat animals, for butchers would pay for them the last ten shillings knowing that they would suffer no loss from tuberculosis at the hands of the meat inspector.

Mr. INGLIS, of Forfar, said: I think you all must admit that we are in favour of some measure of control in regard to these reacting cows, but we also know that in the case of many reacting cows we fail to find their milk to be tuberculous. I do not think, from what I can gather, that the time is quite ripe for a measure being brought out to control these animals. I think we should allow the Tuberculosis Order and the Milk and Dairies Order to work for some time. It might interfere with the working of the Tuberculosis Order if we were to control the reacting cows. I hold very strongly, on that point, that the time is not yet ripe for such a measure to be brought out.

Mr. J. TAYLOR (Edinburgh): I was at the Glasgow meeting last week. From the general argument that went round the table, I gathered that they were just of the same opinion as Mr. Inglis, namely, that the time is not yet opportune for interfering with these reacting cows.

Major ANDERSON: I must admit that I came in the hope that I might hear of some definite decision in this matter. I felt myself that the time for procedure had come when a definite decision could be made. I do not know whether the questions asked also include what time it might be reasonable to make such a decision. It seemed

to me that the question of control really does not arise until there is such a degree of testing going on that there is a large number of cows of this description put on offer, and this will not occur until the number of people going in for producing non-tubercle herds is greatly increased. Certainly, the decision seems right at the moment, but the time has not come, and it will not come until testing is general for the purpose of establishing tubercle-free herds; and that will correspond to the time when there is a demand for the tubercle-free cow, which at the moment seems to me almost more important than the reactor.

Mr. RABAGLIATI: I think we are all agreed on the importance of the motion before us to-day. I am sure that in the back of our minds we all wish very much that some control, such as is suggested, could be put upon reacting animals. However, the opinions of the writers of the letters which the Secretary has read, as well as the opinions of one or two of the speakers to-day, seem to be in favour of waiting; and with this I agree emphatically. I am sure that, so far, the time is not yet ripe for any definite marking or branding of reacting cows. The point which arises in one's mind is this: if a cow has reacted to the tuberculin test and is clinically healthy, is she any more dangerous, if she is put out in the sale ring, than she was before she was tested? If that cow is not more dangerous than she was before the test—and I do not think anybody can suggest that she is—I do not see that we could call upon the owners or testers of these cattle to brand them and thereby render them very much less valuable than they were before. Take the case of the man who wants to buy a tubercle-free cow and has it tested in the public market. If that cow reacts and has to be branded, who is going to stand the loss? The dealer is not going to allow his cow to be tested if he knows that if she reacts he is going to lose a half or a third of its value—because I do not think anybody would pay the same for a cow that he knew was a reactor, as he would for a cow when he did not know whether she was going to be a reactor or not. I spoke to Mr. Begg about this matter. He said there were some cows in Lanarkshire which were sold as definitely reacting cows, and his view, apparently, is that the value of such animals was not greatly lessened. All the same, personally, I do not think that, if you take it up and down the country, anybody would pay the same price for such an animal if he was quite sure she was a reactor. There are, I believe, certain medical authorities who go the length of saying that a cow which has reacted to the tuberculin test should not be put into a byre to produce milk for human consumption. I heard of a case where a medical officer had written to a Medical Authority asking whether such a cow was fit to be kept in a byre, because he happened to know that such an animal had reacted to the tuberculin test. The Medical Authority answered that if the cow had reacted she was liable at some time to excrete tubercle bacilli in her milk, and therefore the Medical Authority thought she should be kept out of the byre. In the opinion of such Medical Authorities, if you had reacting cows branded they would be "taboo" from being put into any byre. Although I do not think the ordinary medical man would go to this extreme, all the same I do think that that point should be considered. The branding of cows leads up to an enormously wide question. We have the danger of fraud and of doping. Another point is this, that if the cows are to be branded or marked in some way if they react, who has to mark them? Is any qualified veterinary surgeon to be allowed to mark them? If not, it would cause a great deal of ill will and bad feeling where such men as inspectors, and not others, were allowed to brand them. A further point is that if people know that all the cows which react have to be branded, I think it will give a great set-back to the employment of the tuberculin test. We want to encourage testing with tuberculin as much as possible. But any step like this which we might take, perhaps in good faith, might do more to defeat our own ends than if we were to wait until the time is perhaps more ripe.

Mr. POOL: I take it that we all realise very fully the extreme difficulty of dealing with the reactor to the tuberculin test, on account of the very high percentage of infection in our herds in this country. It is largely a matter of money, and the country probably could not afford to lose its reactors at present. We are in an unfortunate position of having to consume milk from cows which would react if they were tested. Legislation, in any case, can never be successful if it gets ahead of public opinion, and I do not think that we could say that public opinion in the country at present would be quite ready to deal adequately with reactors to the test. It really would not be fair to penalise the man who tests his cows at present; because, as we know, only a very small percentage are tested. We ought, first of all, to introduce legislation making the necessary tests compulsory in all dairy herds. It seems that it is such an enormous question, and so much money is involved, that we can only proceed on the lines we are doing now, gradually trying to eliminate the worst cases, and gradually, by means of educating the public, grading up our herds. When you have reduced the infection to a sufficiently low figure, it would be possible to introduce legislation requiring compulsory testing and then allowing compensation for reactors. At present it seems the percentage of infection is so high in this country that it is altogether outside of practical politics to do anything further at the present time. Mr. Rabagliati raised one very interesting point as to whether it would be safe to keep the reactor in a herd. I presume he means that the reactor which is not clinically affected is claimed by some very competent authorities intermittently to excrete bacilli in the fæces, the bacilli getting into the fæces by the bowel. Well, that is claimed, I know, but it has not yet been recognised and it has not yet been adequately proved.

Mr. A. GOFTON: I think I ought to say that I am the party who is responsible for having had this motion sent out to the Divisions in its present form. I have rather pressed for it to be sent down in the form in which it has been sent out, in order that we might get a clear expression of opinion from the Divisions on this question. I was also anxious that it should come down in this form because I have, rightly or wrongly, a very strong impression that those who raised this question in the North North of England and those who have discussed it in the Council and Committee Meetings of the National Association, have not yet realised the magnitude of the problem which they are attacking. I think they have failed to realise that the control of the reacting cow is not a separate question. It is only one small part of a big question—the whole question of the control of bovine tuberculosis. I think that is the point that ought to be emphasised, that this is really one part of a big question, and, in my view, not by any means the most important part of it. Floating in the minds of those who have been pushing forward this question I think there has been the idea of fraud which is associated with the exposure in markets of cows which have reacted to tuberculin test. I think that we, as a veterinary profession, should eliminate from our consideration of this problem the consideration of the question of fraud. I do not mean to suggest that we should shut our eyes to it and do nothing to prevent it, but what I mean is that we should approach this question from the point of view of disease and the control of disease and not from the point of view of prevention of fraud. Unless we approach it from that line, we will be liable to get into deep waters from which we would have considerable difficulty in getting out. If we are going to tackle the problem of bovine tuberculosis, I maintain that the reacting cow is not the correct point at which to start a campaign against tuberculosis. I think we have to go a long way before we reach the stage at which we can say that we are ready to tackle the reacting cow. If we begin by dealing first with the reacting cow, what is going to be the effect? I have not the slightest doubt that the first effect will be to retard and seriously to hinder the establishment of tubercle-free herds for the production of milk. The establishment

of tubercle-free herds is a procedure which we ought to encourage by every means in our power. Apart altogether from the public health aspect of the question, that is, in my view, the first line along which we must proceed if we are going to get any progress at all towards the elimination of tuberculosis in bovines. I am quite satisfied that if we do anything whatever to retard the establishment of tubercle-free herds, we will be taking a step which is most prejudicial in any ultimate campaign against tuberculosis.

The second thing which I think will result from an attempt to tackle the reacting cow at present is that we will, in so doing, blacklist the cow which has reacted, and which may conceivably be, and probably is, of very much less danger to the human race than may other cows which are not tested and which are openly put on the market. We know it is a common practice among certain breeders and commercial dairymen, who from their observation of a cow in the byre suspect that she is tuberculous, to adopt the procedure of having her served, treating her well, calving her, and selling her as a newly-calved cow. To my mind, that is an infinitely more fraudulent and more dangerous procedure than is the exposure of a cow which has merely reacted and shows no clinical symptoms of disease. It is much more dangerous both to the rest of the cows amongst whom she goes and to the human race that consumes her milk. A third and most important result would follow from this attempt at control, namely, that it would inevitably encourage and increase the fraudulent use of tuberculin. I cannot conceive of any procedure for controlling the reacting cow, that is not at the same time going to increase the temptation to use tuberculin in a fraudulent manner. Any attempt to control the reacting cow must be associated with the control of the use and distribution of tuberculin itself. Apart from these considerations, in my view the control of the reacting cow at the present time is not a practical proposition. I deliberately had the question which has been sent to the Divisions framed in the form in which it is framed, because I wished those who were pressing for action to submit definite proposals as to the means by which control could be applied and rendered effective. I do not anticipate that any practicable proposals will be forthcoming. Any attempt to control the reacting cow at the present time, to my mind, would entail setting up machinery and administration the cost of which would far exceed any results which are likely to be achieved. I beg to move that:—

> "The Scottish Metropolitan Division resolves to answer the first question asked by the Council of the N.V.M.A., in the negative. In the opinion of the Division, the control of the reacting cow cannot be considered as a separate and distinct problem, but must be considered in its relation to the whole problem of bovine tuberculosis. The Division desires also to record its considered opinion that the control of the reacting cow is not the most urgent part of the larger problem, and that to make the reacting cow a starting point in the campaign against bovine tuberculosis will be prejudicial in its effects."

Dr O. CHARNOCK BRADLEY: I have great pleasure in seconding that motion. Judging from the discussion that has proceeded so far, I do not think there will be any doubt as to its being carried.

Major ANDERSON: The motion refers to the question of bovine tuberculosis. Well, this problem of a reacting cow, does not really arise in connection with an attempt to deal with bovine tuberculosis as a whole; it is largely in connection with the putting out of reactors from the herd. Is that definition there not too wide? That might never arise in a lifetime.

Mr. GOFTON: I think that really the vital part of my motion is to point out that you cannot separate the question of the control of the reacting cow from the big problem of bovine tuberculosis. I think that any attempt to deal with them in two portions would be prejudicial in its results.

Major ANDERSON: I think the reference might be to the establishment of tubercle-free herds.

The PRESIDENT: You mean that the reference from the N.V.M.A. is meant to apply to the establishment of tubercle-free herds? But you cannot separate that from the whole question of the eradication of tuberculosis.

Major ANDERSON: There is really nothing in it; it seemed to be giving a little more point to the definition of the problem.

Mr. GOFTON: If you are going to go out into the country and say to every man who is trying to establish a tubercle-free herd: "We are going to penalise you to the extent of branding and black-listing every cow that reacts in your herd," you are going to damn the establishment of tubercle-free herds altogether. I want that to be emphasised as strongly as I can. To look at this question from the narrow point of view, is going to be very prejudicial in any ultimate steps which you may take.

The PRESIDENT: The letter from the N.V.M.A. does not merely say that it is in connection with the control of cows in relation to the establishment of tubercle-free herds. Personally, I agree with Mr. Gofton that we cannot separate it. Do you wish to move an amendment, Major Anderson?

Major ANDERSON: No.

The PRESIDENT: If there is no amendment, I now put the motion. (Motion carried unanimously). Personally, I think that this matter which has been brought up before us is one of the most important matters ever raised before the veterinary profession. One is very glad that it has been discussed. I agree absolutely with the motion which has been put forward.

On the motion of Dr. O. Charnock Bradley, a very hearty vote of thanks was accorded to the Chairman, who, in a word, replied.

WM. C. MILLER, *Hon. Secretary.*

Midland Counties' Division.

ANNUAL MEETING AT BIRMINGHAM.

The Annual Meeting of the Midland Counties' Division was held in the English Theatre at Birmingham University on Friday, February 11th, when the President (Mr. J. O. Powley) occupied the chair. The other members present were: Messrs. T. H. Hobson (Leicester), B. DeVine (Birmingham), F. L. Gooch (Stamford), H. Tudor Hughes (Oswestry), J. L. Cormack (Coventry), J. C. Deville (Uttoxeter), A. B. Forsyth (Cannock), A. Mackenzie (Market Drayton), J. Martin (Wellington), T. Martin (Wellington), T. S. Slipper (Sutton Coldfield), J. R. Barker (Hereford), J. W. Conchie (Kidderminster), Colonel T. Marriott, R. Murray (Rugeley), S. M. Woodward (Birmingham), R. Palmer (Warwick), L. W. Heelis (Solihull), W. Trigger (Newcastle-under-Lyme), H. W. Steele-Bodger (Tamworth), J. M. Whyte (Tenbury), G. F. Banham (Stratford-on-Avon), G. H. Leader (Bridgnorth), G. V. Tyerman (Ludlow), H. W. Dawes (West Bromwich), C. J. Clifford (Shifnal), W. H. Brooke (Handsworth), F. Somer (Birmingham), T. Gold (Redditch), O. V. Gunning (Tutbury), R. Clunas (Market Drayton), and the Hon. Secretary (Mr. H. J. Dawes, of West Bromwich).

Apologies for inability to attend were announced from Sir John M'Fadyean, Major F. Hobday, Dr. Graves, Messrs. E. Ringer, Trevor Spencer, W. J. Dale, J. J. Burchnall, Mark Tailby, E. Franklin, W. L. Gascoyne, L. C. Tipper, W. Beddard, W. Tart, T. J. Brain, T. Baxter, E. Hall, R. L. Phillips, T. Ludlow, P. D. Bayliss, A. H. Hamilton, C. S. Hunting, W. W. Grasby, R. Hughes, A. A. Forsyth, L. C. Maguire, R. P. Holmes, H. Fenton, W. E. Ison, J. P. Carless, G. H. Barber, R. C. Trigger, H. L. Pemberton, D. Forwell, R. Watts, C. F. Parsons, B. R. Benbow, and H. S. Reynolds.

New Members.—The following gentlemen, duly nominated at the previous meeting, were elected members of the Division:—Messrs. O. V. Gunning (Tutbury), E. Wilkinson (Burton-on-Trent), and G. H. Leader (Bridgnorth).

Council's Report.

The Hon. Secretary presented the following report of a meeting of the Council held earlier in the day :—

Recommended that Mr. S. M. Woodward, the Senior Vice-President, be appointed President of the Association for the ensuing year, and that the Vice-Presidents be Messrs. J. O. Powley (as retiring President), R. Hughes and J. Cormack.

Recommended that other offices be filled as follows :—Hon. Secretary, Mr. H. J. Dawes ; Hon. Treasurer, Mr. W. H. Brooke ; and Auditors, Messrs. F. L. Gooch, T. H. Hobson and H. Tudor Hughes.

Recommended that Messrs. DeVine and H. W. Dawes be appointed to fill vacancies on the Council caused by the resignation of Mr. Heelis and the election of Mr. Hobson as an auditor, all officers being *ex. officio* members of the Council.

Recommended that the next quarterly meeting be held in Birmingham and that Dr. Stanley White, of Parke, Davis and Co., be invited to give an address on vaccines.

The Hon. Secretary announced the receipt of a letter from the N.V.M.A., inviting an opinion on the question of the control of cows reacting to the tuberculin test. Resolved, that in order to allow time for a fair discussion, the letter lie on the table until the next meeting.

Recommended that the President be deputed to represent the Association at the Annual Congress of the Royal Sanitary Institute at Hastings next July.

The Hon. Treasurer announced that he had received letters of resignation from Mr. Beaumont of Bishop's Castle, who has gone abroad, and from Mr. Tom Chambers of Dudley. Resolved that Mr. Beaumont's resignation be accepted with regret, and that Mr. Chambers be asked to reconsider his decision.

The President announced that he had been asked to stand as the representative of the Board of Agriculture on the Council of the Royal College of Veterinary Surgeons. He had somewhat reluctantly agreed to do so, and said that to have any chance of success he must have the backing of this Association. Recommended very heartily that members be asked to give their whole-hearted support to Mr. Powley at the forthcoming election.

Mr. DeVine, in moving that the report of the Council be adopted, said it was with great pleasure that he had heard of Mr. Powley's decision to stand for the Council of the Royal College. No one was in closer touch with veterinary surgeons throughout the country than Mr. Powley, and no one enjoyed their confidence in a greater degree. It was only right and proper that the Ministry should be represented on the Council of the Royal College, and a better man than Mr. Powley could not be found. He was quite sure their retiring President would command the vote of every member of the Midland Association.

Mr. Heelis seconded the motion, which was carried unanimously.

Election of Officers.

The election of officers for the ensuing year proceeded formally on the lines recommended by the Council in its report. Mr. Woodward's acceptance of the Presidency was hailed with hearty applause. He said he was afraid Mr. Dawes had trapped him into making a promise, because the honour was not one he would have sought himself. However, if it was the wish of the Division that he should fill the office, he would do his best to maintain the high standard set up by his predecessors. The only thing that induced him to accept the position was the knowledge that Mr. Dawes, their very able and popular Secretary, would be at his right hand to do for him what he had done for so many presidents before him.

Treasurer's Financial Statement.—The Hon. Treasurer presented the balance sheet for the past year, duly audited. This showed a balance in hand of £112 17s. 3d., in addition to a sum of £100 invested in War Stock. Members' subscriptions amounted to £66. The expenses included an annual subscription of £5 5s. to the Royal Veterinary Benevolent Fund and a special donation of £5 to the same object.

The President, in moving the adoption of the balance sheet, referred to the large number of subscriptions that were in arrears. He thought members who were more than three years behind with their subscriptions should be struck off.

R. V.C. Building Fund.—The Hon. Secretary thought that, as the Division had a good balance in hand, something should be done for the building fund in connection with the Royal Veterinary College at Camden Town. He observed that the Royal Counties' Division had contributed fifteen guineas and that Division could well afford to do the same. He gave notice that at the next meeting he should move that this be done.

It was resolved, on the motion of Mr. DeVine, that the annual subscription to the Royal Veterinary Benevolent Fund be again doubled this year.

Thanks to retiring officers.—Mr. Cormack moved that the best thanks of the Division be accorded to the officers for their services during the past year. The continued progress of the Division was entirely due to their efforts and, whilst complimenting Mr. Powley on his conduct in the Chair, he said chief credit was due to their Honorary Secretary for his management of affairs generally.

Mr. Mackenzie seconded the resolution, which was carried by acclamation.

Mr. Dawes, called upon to reply for the officers as a whole, said his secretarial work, spread over a large number of years, was a labour of love to him, and he was best rewarded by the appreciation which the members showed for anything he had done.

A joint meeting with the Northern Branch of the National Veterinary Medical Association followed, and is made the subject of a separate report. [To appear next week.—Ed.]

H. J. Dawes,
Hon. Secretary.

The Annual Dinner.

In the evening the Annual Dinner was held at the Grand Hotel, Birmingham, Mr. Powley again presiding. He was supported by the President of the Royal College of Veterinary Surgeons and the President of the National Veterinary Medical Association, both wearing their chains of office, together with several other distinguished visitors and friends. A splendid repast was followed by a short toast list.

Mr. H. Tudor Hughes proposed "The Royal College of Veterinary Surgeons," and said members of the Council were welcomed in any gathering of the profession. What they did for the profession was recognised and appreciated. Colonel Brittlebank, during his presidency, had witnessed some notable changes, including the introduction of academic dress at meetings of the Council, and a refurnishing scheme at headquarters. At the present time the Council was engaged in reviewing some of the features of the curriculum, and in all the Council's activities was an evident desire to promote the best interests of the profession.

This toast was acknowledged by Colonel Brittlebank, who agreed that the Royal College deserved the good opinion of all who belonged to it. Many changes had been wrought during the last few years. The old diehards used to prophesy nothing but disaster, but what had happened ? The profession had contined to thrive, and he did not think it had yet realised anything of the greatness that was in front of it. The Council could claim some credit for this, because, with the status of the general practitioner ever under consideration, everything possible had been done to create and to foster a spirit of unity. Of the many matters at present engaging the attention of the Council, there was one to which he would especially refer, and that was the work of a joint committee of representatives of the Royal College and the meat trade. "We do not believe," continued Colonel Brittlebank, "that meat inspection throughout this country has provided the necessary security to the public, and we do not believe that any system which is not

under the control of the veterinary profession ever will do so. The first resolution passed by this joint committee was that the people pre-eminently fitted to deal with meat inspection are qualified veterinary surgeons. When I tell you that this resolution was proposed by a butcher and seconded by a butcher, you will realise how thoroughly they meant what they said. The Council knows how true this is and although there is still a long way to go, the veterinarian's proper place in the control of public health is going to be established. That will only be brought about when public opinion has been properly educated." He concluded by congratulating Mr. Powley upon his forthcoming candidature for a seat in the Council. As President of the Midland Division, Mr. Powley had everything to recommend him, whilst as a distinguished member of the Veterinary Department of the Ministry of Agriculture, he would command the support of every practitioner who knew him.

Professor G. H. WOOLDRIDGE proposed "Continued Success to the Midland Counties' Veterinary Medical Association." He said that, as President of the "National" he looked to an Association like the Midland for a lead. It was a live wire, and had long been distinguished for the able way in which its affairs had been managed. In proof of this, he need only refer to the joint meeting with the Northern Division of the "National" held that day, and a most sensible thing to do was to invite farmers to attend to listen to Mr. Boutflour's theory of dietetics. Veterinary surgeons were closely allied to the agricultural community, and nothing was lost by letting farmers see that the profession honestly desired to do its best for the animal population of this country.

The PRESIDENT, in returning thanks, said it was quite true that the Midland Division was strong both in point of numbers and in influence. That was entirely due to the energy and devotion of Mr. H. J. Dawes, the Honorary Secretary, and it was not right that anyone else should have the credit.

The concluding toast was that of "The Visitors," proposed in felicitous terms by Mr. H. W. DAWES and acknowledged by Mr. WILLIAM WOODS (Wigan) and Mr. HOLROYD (President of the Lancashire Division).

EXPORT OF HORSES BILL.

The Bill to amend the law with respect to the exportation of horses, which Mr. Ammon introduced in the House of Commons recently, seeks to extend the prohibition on shipping, or attempting to ship, unfit horses so as to include any horse unless certified by a veterinary inspector to be of not less value than £30 in the case of an aged horse and to be not more than seven years of age and of not less value than £4 in the case of an ass. If any horse is found to be in such a physical condition that it is cruel to keep it alive or to be permanently incapable of being worked without suffering, the veterinary inspector would be empowered under the Bill to have it slaughtered immediately with a mechanically operated instrument, no compensation being made to the owner.

H.M. STATIONERY OFFICE PUBLICATIONS.

The undermentioned have been published during the week. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses:—London: Adastral House, Kingsway, W.C.2, and 28 Abingdon Street, S.W.1; Cardiff: 1 St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120 George Street.

	Price Net.		*Post Free.*	
HOUSE OF COMMONS BILLS, 1927.	s.	d.	s.	d.
7. Road Transport Lighting. To regulate further the Lighting of Vehicles ...	0	3	0	3½
93. Exportation of Horses. To amend the Law with respect to the Exportation of Horses	0	1	0	1½

NOTES AND NEWS.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

Sept. 12-17th.—N.V.M.A. Congress at Torquay.

April 4th—R.C.V.S. Special Committee on Veterinary Research, 2 p.m.
B.M.A., Meeting on Dogs Protection Bill at Tavistock Square, London, W.C.1., 4-30 p.m.

April 6th—R.C.V.S., Special Meeting of Registration Committee, 2 p.m.; House Sub-Committee, 4 p.m.; R.A.V.C. Sub-Committee, 4.30 p.m.
N.V.M.A., Appointments Committee, 5-30 p.m.; Veterinary Inspectors' and Public Health Committee, 6 p.m.; Council Meeting, 7 p.m., at 10, Red Lion Square, London, W.C.1.

April 7th—Meeting of the Central Division, at 28 Red Lion Square, W.C.
Annual Meeting of the Eastern Counties Division at Ipswich.
R.C.V.S., Examination Committee, 10 a.m.; Irish Free State Sub-Committee, 11 a.m.; Parliamentary Committee, 12 noon; Registration Committee, 2 p.m.; Dinner Committee, 3.30 p.m.; Chairmen's Committee, 4 p.m.
Victoria Veterinary Benevolent Fund Council Meeting, 5 p.m., 10 Red Lion Square.

April 8th—R.C.V.S., Publications Committee, 10 a.m.; Finance Committee, 11 a.m.; Council Meeting, 2 p.m.
Organising Committee International Veterinary Congress, 3.30 p.m., 10 Red Lion Square.

April 12th—Meeting of the Derbyshire Division at Derby.

The Torquay Congress Programme.

Our readers will note with interest the publication, in this issue of the *Record*, of the Provisional Programme of the Annual Congress of the Association, to be held at Torquay from September 12th—17th. We are confident that all will agree that the Provisional Committee have done their part to ensure the success of the Meeting by catering so admirably for the tastes of every member of the Association, whatever his sphere of work.

Two features of the programme are specially notable as representing a renewed endeavour, after initial setback, to meet the widely-expressed wishes of members. They are the delivery of a Popular Lecture and the provision of a Section of Veterinary Preventive Medicine. The association of Sir John M'Fadyean's name with the former is a guarantee of

its success and, in regard to the latter, we are glad to observe that on this occasion care has been taken to ensure that the proceedings of the Section shall not clash with the presentation of other papers.

The Town Hall has been secured, we understand, for the holding of the various meetings, and adequate provision has been made in the centre of the town for the performance of the surgical demonstrations.

Members are advised to make early application for rooms, and to facilitate their choice in this important matter, we also publish a list of recommended hotels, with charges.

At a later date we shall give the details of the excellent social programme which is being arranged and which will contain features of special interest to the many ladies who will be gracing the Congress with their presence.

Personal.

R.C.V.S. Jubilees.

Congratulations to the following members on attaining the sixtieth anniversay of their graduation as Members of the Royal College of Veterinary Surgeons :—

April 22nd.—Sir Francis Duck, K.C.B., F.R.C.V.S., Nooitgedacht, Somerset West, Cape Province.

April 27th.—Fredk. H. Reeks, M.R.C.V.S., Stonegate, Spalding, Lincs.

April 29th.—John Vickers Blake, M.R.C.V.S., Ryde, Isle of Wight.

Also to the following on attaining the fiftieth anniversary of their graduation :—

April 3rd.—Thomas Chambers, M.R.C.V.S., 41 Wolverhampton Street, Dudley, Worcs. ; Geo. Hammond Harris, M.R.C.V.S., Sawbridgeworth, Herts ; Harry Moore, M.R.C.V.S., Worksop, Notts. ; Lawrence C. Tipper, M.R.C.V.S., Ribbesford, Wake Green Road, Moseley, Birmingham.

April 4th.—Thomas F. Hogben, M.R.C.V.S., Ash, Canterbury ; Robt. E. Hoile, M.R.C.V.S., Grove House, Wrightington, Wigan.

April 5th.—John Foulston, M.R.C.V.S., Keelby, Lincs.

April 6th.—John A. Clarke, M.R.C.V.S., 4 Beaconsfield Parade, Hunstanton ; Edward Moore, M.R.C.V.S., 15 Green Street, Albany, U.S.A.

April 15th.—John Cowan, M.R.C.V.S., New Galloway, Kirks.

April 18th.—Archibald Baird, M.R.C.V.S., Coveyheugh, Reston, Berwick ; William W. Reekie, M.R.C.V.S., 25 Edgeware Road, W.2 ; Michael Smith, M.R.C.V.S., Mullingar, Co. Westmeath.

April 19th.—William Atkinson, M.R.C.V.S., 117 Upper Grosvenor Road, Tunbridge Wells ; Richard Malone, J.P., M.R.C.V.S., Selshar, Wexford.

April 21st.—John Gray, M.R.C.V.S., Tongue, Tarbolton, Ayr ; James Macqueen, F.R.C.V.S., Royal Veterinary College, Camden Town, N.W.1.

. . . . . .

Appointments.

"Dr. Tom Hare, of the Liverpool University, has been appointed by the Ministry of Agriculture and Fisheries to assist in foot-and-mouth disease research, and is going to the Lister Institute of Preventive Medicine in London," says the *Liverpool Post*, of March 22nd.

"Dr. Hare holds both medical and veterinary qualifications. He has worked for several years in the Thompson Yates Laboratory of Pathology, first as Thelwall Thomas Fellow, and then as Holt Fellow. He was president of the Guild of Undergraduates six years ago."

. . . . . .

Mr. V. Pryde Jones has been appointed veterinary surgeon to the Jockey Club. Mr. Pryde Jones, who succeeds Mr. E. W. Livock, accompanied Papyrus on his famous journey to the United States. He has for some time acted as veterinary surgeon to the King's racing establishment. Mr. Livock, although having retired from practice, is in charge of the Jockey Club reception stables at Links Farm.

. . . . . .

Movements of R. A. V.C. Officers.

Major P. S. Sparling reverted to the British establishment from the Sudan Defence Force on the 8th October, 1926, and is now doing duty at Hounslow.

Captain M. Farrelly was seconded for duty with the Sudan Defence Force on the 8th October, 1926.

Major H. C. Stewart arrived from India on the 26th November, 1926, and is now doing duty at Catterick.

Major E. Tillyard, O.B.E., returned from Egypt on the 28th November, 1926, and is now doing duty at Tidworth.

Major H. E. A. L. Irwin was placed on Half Pay on account of ill-health on the 3rd December, 1926.

Major H. Bone, M.C., reverted to the British establishment from the Sudan Defence Force on the 6th December, 1926, and is now doing duty at Tidworth.

Major F. C. O'Rorke, C.M.G., F.R.C.V.S., was posted from Newcastle-on-Tyne to the Royal Military College, Camberley, for duty on the 6th December, 1926.

Major F. J. Weir sailed for Iraq on the 7th December, 1926, for a tour of foreign service. He is proceeding to India shortly.

Major H. J. Holness, D.S.O., returned from India on the 15th December, 1926, and is now doing duty at Brighton.

Lieutenant F. W. Goodall sailed for India on the 16th December, 1926, for a tour of foreign service.

Major J. J. M. Soutar, O.B.E., was seconded for duty with the Iraq Army on the 16th December, 1926.

Lieutenant J. J. Kane sailed for India on the 23rd December, 1926, for a tour of foreign service.

Captain J. Southall was posted for duty from Catterick to Aldershot on the 1st January, 1927.

Captain H. Jerrom returned from India on the 24th January, 1927, and was posted to Tidworth for duty. He proceeded to the Rhine for temporary duty on the 7th March, 1927.

Major L. Danels sailed for China on the 29th January, 1927, for duty as Senior Veterinary Officer of the Shanghai Defence Force.

Captain H. J. Hughes, M.B.E., sailed for China on the 6th February, 1927, for duty with the Shanghai Defence Force.

Captain K. S. Simpson sailed for India on the 15th February, 1927, for a tour of foreign service.

Lieutenant-Colonel H. Gamble, O.B.E., F.R.C.V.S., sailed for Egypt on the 16th March, 1927, for duty as Assistant Director of Veterinary Services, British Troops in Egypt.

Major W. St. J. F. Macartney sailed for Egypt on the 16th March, 1927, for a tour of foreign service.

. . . . . .

The Annual Dinner of Officers of the Royal Army Veterinary Corps, past and present, will be held at the Hotel Cecil on Friday, the 17th June, 1927, at 8 p.m.

Gentlemen desirous of attending should inform the Honorary Secretary, R.A.V.C. Dinner, Army Veterinary Department, War Office, Whitehall, S.W.1.

Mr. H. V. Hughes, B.V.Sc., M.R.C.V.S., D.V.H., has been elected as Hon. Secretary of the North Wales Division N.V.M.A., in succession to Mr. J. H. Wynne, F.R.C.V.S., and Mr. J. McAllan, M.A., B.Sc., M.R.C.V.S., has been elected Hon. Secretary of the North of Scotland Division N.V.M.A., in succession to the late Mr George Howie, senr., M.R.C.V.S.

R.C.V.S. Obituary.

STANLEY, Percy Abel, 105 Union Street, Plymouth. Graduated, London, 19th July, 1907. Died, 21st March, 1927.

"Mr. Stanley was well known in Plymouth and the surrounding district," says the *Western Morning News*.

"He recently acquired the Practice of Mr. Bond, veterinary surgeon, Stonehouse, and was formerly with Mr. Gibbings, veterinary surgeon, of Tavistock, where, owing to his interest in agricultural affairs, particularly exhibitions, and also hunting events, he became known as a popular and efficient veterinary surgeon, having acted in an official capacity at several of the district shows.

"A native of Burton-on-Trent, Mr. Stanley came to Tavistock some seven years ago. He underwent an operation in the Homœopathic Hospital for abscess of the lung a few weeks ago, and appeared to be making good progress, but had a relapse and gradually sank.

"He leaves a widow and family of four."

Notanda.

Gynæcology may be said to be one of the most ancient branches of medicine. The papyrus of Ebers, which is one of the oldest known works on medicine, and dates from 1550 B.C., contains references to diseases of women, and it is recorded that specialism in this branch was known among the ancient Egyptian medical practitioners.

. . . . . .

Disease or removal of the pituitary, thyroid or parathyroid glands produces profound derogatory effects upon the animal system, but disease or removal of the adrenals is fatal.

. . . . . .

Pedanius Dioscurides, from Anazarbe, who lived in the time of Nero and Vespasian, was the most important pharmaceutical writer of ancient times. He simplified greatly the pharmacopœia, which had then assumed unwieldy dimensions, and freed it from ridiculous superstitious remedies.

. . . . . .

The valves in the veins were discovered by Giambattista Cannani, Italian, who was physician in-ordinary to Pope Julius III. (1550).

. . . . . .

The dysentery bacillus was discovered by Shiga in 1897. In 1902 this bacillus was looked upon as the cause of summer diarrhœa in infants. H. K.

R.A.V.C. Point-to-Point.

The Royal Army Veterinary Corps Annual Point-to-Point Race will be run this year on April 23rd in conjunction with the Hambledon Hunt Club Point-to-Point Steeplechases which will take place at Liss, Hampshire, which is situated one mile from Liss station, five miles from Borden station and three miles from Petersfield.

The 1st race is at 1 p.m. and the R.A.V.C. Race is at 2-45 p.m. All Regular, Special Reserve, as Territorial R.A.V.C. officers (on the Active or Retired Lists) are now eligible to enter a horse for this race.

There will be a Corps tea tent on the course—tickets price 2s., must be purchased prior to the meeting and are obtainable from the Hon. Secretary. Entries close 13th April, 1927, to the Hon. Secretary, from whom detailed particulars of the race can be obtained.—C. H. S. Townsend, Major R.A.V.C.

Hon. Secretary, R.A.V.C. Point-to-Point Association,
West Cavalry Barracks,
Aldershot.

Veterinary Work in Colonies and Protectorates.

In the House of Commons recently, Mr. Ramsden asked the Secretary of State for the Colonies what sums had been expended from crown colony and other funds in obtaining expert advice with regard to veterinary matters affecting the crown colonies, protectorates, and mandated territories.—Mr. Amery replied: I assume that my hon. friend does not refer to expenditure on the maintenance of Veterinary Departments and their staffs or to such expert advice as is given in the ordinary course of their work by the Imperial Bureau of Entomology or by the Bureau of Hygiene and Tropical Diseases in its "Veterinary Bulletin" but to special expert advice. A grant of £10,000 has been made from the Empire Marketing Fund for the purpose of carrying out an investigation into the mineral content of natural pastures in Kenya, acting under the advice of Dr. J. B. Orr, of the Rowett Research Institute. It is not possible to state how much of this sum will actually be expended in Kenya. At the request of the Nigerian Government, Dr. P. J. du Toit, Deputy Director of Veterinary Education and Research in the Union of South Africa, visited the Colony in January last to investigate mineral deficiency in pastures, and to report generally on local veterinary matters. The cost to Nigeria of the visit was approximately £450.

Ancestry of the Horse.

"The Zoological Society owns an unusually fine male of Prejevalsky's Wild Horse, presented by the President in 1919. The Duke of Bedford has now given a second example of the species, a young but adult mare. The pair have been put together in one of the Park Paddocks in the hope that they will breed. Prejevalsky's Horse is the only living wild species of horse, and is now to be found only in the remotest parts of Mongolia. It has a large and heavy head, a light dun coat, with dark brown or black mane, tail, and legs.

"Modern horses are almost certainly descended from two types, the Northern or dun type, most nearly represented by Prejevalsky's wild horse, and the half-domesticated ponies of Norway, Iceland, and the Hebrides, and the Southern or Barb type, represented by Barbs, Arabs, and thoroughbreds, in which the typical colour is bay with black points, and very often a white star on the forehead. A slight depression in front of the socket of the eye, most visible in the skull, is thought to be remnant of a large face-gland present in the extinct ancestor, *Hipparion*. Most modern breeds, which have been greatly modified by selection, probably contain an admixture of the two species."—*The Times*.

CORRESPONDENCE.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

"The Tuberculin Test."

To the Editor of The Veterinary Record.

Sir,—We believe that your Editorial of the 19th March was not ill-timed, but that it is very difficult in writing on this subject, particularly at the present time, to avoid "a suggestion, underlying some statements . . . which will not meet with the unqualified approval of the rank and file of the profession." We do not think Major Dunkin's

letter will have a better fate. We failed to detect "a suggestion, . . . , which is exceedingly dangerous." Certainly certain words, phrases and sentences might have been better chosen, but the sense and spirit of the Editorial do not call for criticism such as Major Dunkin poured forth.

It is a fact that purchasers of tested animals frequently wish to have the temperature "chart" included in the certificate. At certain cattle sales tested animals must be accompanied by certificates showing the temperatures recorded at the test. These temperatures we have seen printed with the particulars of the entry in the sale catalogue. Whatever the ethical views on this point be, these "charts" *are* sought and *are* supplied by practitioners. Obviously "owners or their cowmen" who wish to see a chart; can, or imagine they can, make use of it and have them given. Up to the present the "charts" supplied are those relating to a subcutaneous test. Therefore until the intradermal test has firmly established itself (in the widest sense) or, perhaps, until "owners or their cowmen" know they may have a "chart" of that test (to make whatever use they can or do make of "charts"), the subcutaneous test will not be supplanted. Very obviously, to us, this was the point paragraph eight of the Editorial was intended to make. In Major Dunkin's case it evidently failed to drive it home.

We do not consider that the Editorial advocated, or even suggested, "methods of procedure to veterinary surgeons which call for consultation with their clients as to the correct interpretations of results of their work————." Major Dunkin writes: "Surely it must be one of its (the intradermal tests) main advantages, for the interpretation must, as is correctly stated, be carried out ENTIRELY by the veterinary surgeon, and it is not possible to leave this work to the owner or his cowman." We say, "SURELY if a veterinary surgeon makes a practice of discussing the actual reaction to the subcutaneous test with, or even leaving part of the work to, the owner or his cowman he will be able to do so when he uses the intradermal test." The reactions to the intradermal test have been described in papers to which agriculturists have access. The layman who *to-day* takes an intelligent interest in the reaction to the subcutaneous test will certainly *to-morrow* be equally interested, and "wise,' regarding the intradermal. We go further and say that we feel satisfied that there are laymen—certainly "owners" if not "cowmen"—who, as the result of the extensive use of the intradermal test on their farms (example: possibly some of those associated with the investigation of the value of the test from its earlier days and who have written on the subject) have more experience in the interpretation of this test than we have.

Major Dunkin's second quotation, "If there are any doubtful reactions, etc.," is not an admission (as he would have us think) but makes obvious the editorial attempt to be fair.

A part of the comment on the third quotation is justified. Of course, pre-inoculation temperatures are *essential*. If a veterinary surgeon permits an owner to take pre-inoculation temperatures (which, according to the Editorial, is possible), Major Dunkin sees "no reason why he (the owner) should be precluded from taking the whole lot." We had credited the Major with higher reasoning powers. If his exclamation marks at the end of that paragraph were intended to pour contempt on what had been written in the Editorial, we think them entirely out of place.

The Editorial, in our opinion, did not "advocate methods of procedure to veterinary surgeons which call for consultation with their clients as to the correct interpretations of the results of their work." We are satisfied that the Editor, his Committee and the Council of the N.V.M.A. wish to assist veterinary surgeons in the selection of that method which will be most accurate and suitable to each of the variety of circumstances met in the practice of their profession.

We have failed to understand what the phrase, "other methods which rely entirely on the ability, acumen and professional integrity of the veterinary surgeon" is intended to convey. We think the integrity of the veterinary surgeon may be relied upon no matter the mode of test employed or under review. We sincerely hope it is not suggested that one method holds an advantage in that, by its nature, the veterinary surgeon is prevented from acting in a manner which is neither upright nor worthy in its conduct and interpretation.

We expected Major Dunkin, pen in hand, to deal with Professor Macqueen's enquiry: "In what respect is the almost invariable success of the intradermal test so different from the very occasional failure of the subcutaneous test?" It was quoted in the Editorial.

We sign this letter jointly because much of our recent experience of tuberculin testing has been obtained in co-operative efforts, and we jointly hold the views herein expressed.—Yours faithfully, R. F. MONTGOMERIE,
W. HALL SAVAGE.

Bangor,
28*th March*, 1927.

Current Topics.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—Recent discussions at Divisional meetings and letters relating thereon in your correspondence columns are of more than passing interest to the profession.

With regard to the ERADICATION OF TUBERCULOSIS, I quite agree with a lot of what Mr. Henry Gray says, and although a large number of cattle have been dealt with under the Order, it only represents a fraction of what should be dealt with, and what progress or good work is accomplished is to a large extent nullified by the limited scope of the Order, the absence of compulsory testing of all cattle (especially milch cattle) and the control of reactors. In many instances, at present, the owners of the cattle dealt with only get more from the local authority than they would in due course get from the knacker. In other words, it puts a premium on "skins." We all know that nothing of note will be accomplished until all cattle are compulsorily tested and reactors controlled, and no doubt this will in due course come about. We have to proceed cautiously owing to the attitude of the stockbreeding and dairying industry who usually look upon all new innovations as chiefly to augment our income and to decrease theirs.

Those of us engaged in carrying out the Order are well aware that we have to exercise an exuberance of caution as to what animals we include in the Order, as if the market value is placed at all high we are very soon told that the case in question should not (and could not) have come under its provisions. This fact not only causes heart-burning amongst ourselves, but is liable to cause friction with brother practitioners, who may gain the impression that we will not confirm the cases they advise their clients to report.

For some time, it has been a *sine qua non* with some auctioneers (especially in Guernsey and Jersey sales) that all entries must be accompanied by a tuberculin test certificate, and there is no doubt that this should be a general rule at all cattle auctions, but in addition to such a certificate for the animal in question, information as to the number of reactors in the herd from which it came should be put on the certificate. As a primary step it should be made compulsory for all cattle to be tested, and the question of expense in this instance must be considered, as it would be manifestly unfair for the owner to bear all the expense. The owner of such a tested herd could then be given the option of having any reactors slaughtered and compensated to a third of their value, *providing all the cattle in his herd were tested*; or he could be permitted to segregate them and utilise them for breeding purposes under certain quarantine regulations and of supervision. Nobody would be so foolish as to advocate the wholesale slaughter of all reactors, as that would constitute an uncalled-for economic waste. The testing of all cattle

may (*and should*) be left in the hands of the owner's regular veterinary surgeon, and the testing given to someone else should only be resorted to in cases that are not regarded as satisfactorily performed. To designate (as I understand is being done in some areas) a particular veterinary surgeon to do this, to the exclusion of all others, is not only going to cause friction, but is a most unfair treatment of the private practitioner. The private practitioner is the backbone of the profession and has been ploughing a lonely furrow for years, and, in many districts, has induced some of his progressive clients to establish tubercle-free herds long before any Orders were dreamt of. I view with great distrust and suspicion the treatment that is meted out to the private practitioner, and if things go on as they are, he will in time become as extinct as the Dodo. The whole-time veterinary surgeon in any area larger than Lilliput will find his time fully occupied with other matters, without testing herds and poaching on the preserves of the private practitioner. The services and goodwill of the private practitioner are essential to the success of any Veterinary Public Health Service and there is not much fear that the private practitioner will let the whole-time man down. The chances are that he will keep him on the straight but narrow path. The control of reactors, inspection of meat, testing of milk, and superintending the carrying out of the provisions of the Diseases of Animals Acts, are essentially the duties of a whole-time Veterinary Public Health Service. The testing of herds, reporting the results, submitting suspected samples of milk, reporting outbreaks of contagious disease, are essentially the duties of the private practitioner. I am all in favour of the establishment of a whole-time Veterinary Public Health Service, as I am convinced that until this comes into being our profession will never take that place in public affairs that has been its right since its birth. I do not think it very wise when candidates apply for whole-time posts, for their selection to be guided more by the letters they can put after their name than by their practical experience. The M.R.C.V.S. should be a sufficient guarantee where animals are concerned, and the non-possession of extra degrees does not indicate lack of competence, but more often lack of time and cash.

The figures which Mr. Henry Gray gives, regarding the result of testing of milk samples, are interesting, but not convincing and, in my opinion, bulk sampling is not reliable. The proper end to start is at the cow and not at the milk churn or jug. When we remember the filthy way in which most milk is produced, transported and ultimately vended, it is remarkable that it retains its colour, not to speak of its making any pretence at purity. More milk is contaminated after it leaves the cow than before. It is, of course, absurd to state that only cows with tuberculous udders are passing tubercle bacilli in their milk, but it is pure nonsense for Mr. Gray to ask those engaged in tuberculin testing to explain to him why so many samples were found to be infected with tuberculosis.

Mr. Gray knows that the number of milk-producing herds that are tested is very small. He should not address his question to those of his profession who are carrying out isolated testings, but to those officials who are considered to be more competent than we are to carry out the inspection of cows, cowsheds, and milk. In many areas the inspection and taking of samples is being done by the inspector of sewers and privvies, and I could quote more than one ludicrous way in which a sample was taken and the producer informed that his milk was filthy. Until this inspection and sampling is handed over to the only person fit to do it, *i.e.*, the veterinary surgeon, I do not expect much from, nor shall I pay much attention to, the results of sampling, local or metropolitan.

As you, in your Editorial of March 19th, say, Professor Macqueen very tritely asks: "In what respect is the almost invariable success of the intradermal test so different from the very occasional failure of the subcutaneous?" When properly carried out, the latter test is undoubtedly very reliable, but the former is fake proof, is unaltered by any conditions of temperament, environment or feeding, and for convenience and general reliability cannot be surpassed. I have had experiences with the subcutaneous test, applied by myself as well as others, which have not been at all satisfactory. When official departments insisted on whole rows of temperatures, it made it an utterly impracticable proposition for the average practitioner in large herds.

In conclusion, I would touch on another matter. I cannot understand the ire which is apparently aroused in the breasts of some of our members, by the use by the laity of what is termed a name of opprobrium—"vet." Providing no insulting adjective is used as well, I fail to see the objection and, try as we may, the term will never die out. To expect the laity on each and every occasion to address us by our full title, which cannot be said in one breath, is absurd. The suggestive alternatives, such as a "Zoopathologist," make me think of an old rhyme about the monkey house being nearly full, and I am beginning to wonder if these irate gentlemen are in the state attributed to the ocular system of a guinea-pig that is held up by its tail and to mares when they are disturbed in their nests. I should advise the exponents of such alternatives either to join the Mustard Club or to take the advice of a well-known advertisement about Kruschen.

The discussion of this matter is a waste of time. I am afraid that the profession does not fully realise the dangers that menace it from quackery and other sources in the not too far distant future, and it behoves all members to join the N.V.M.A. and make it as effective as the B.M.A., and, having joined it, to support it and abide by its decisions.—Yours faithfully, J. F. D. TUTT, M.R.C.V.S.

1 St. Cross Road,
Winchester.
March 25th, 1927.

Waking Up.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—It is refreshing to read from recent issues of the *Veterinary Record* that the technique of the science and art of veterinary medicine and surgery is advancing. The thought and action being devoted to the comfort and cleanliness of cattle and the eradication of tuberculosis at the present time is an augury of the future good of the race—both human and bovine. The awakening has been slow and long. Many countries have been in advance of our own in the matter.

The prominence now being given to the intradermal test for tuberculosis is praiseworthy. Whatever may be said and written about the subcutaneous test, it has been somewhat of a bugbear to the rank and file of farmers, and the veterinary surgeon who constantly carried it out was perhaps more of a philanthropist than a business man. As a general rule he was never adequately repaid for the time and trouble spent in applying this test. All doubt about the utility, service, and suitability of the intradermic test ought long ago to have been set at rest. So far back as 1922 over 2,800,000 cattle in America had been tested by this method under the auspices of the Bureau of Animal Industry. This is a scientific body: it does not test cattle for fun; its conclusions may be accepted as authoritative, and it has long ago stated (and surely not without experience) that *the test is as reliable as any other method*. Animals of all ages can be tested; it interferes little with farm routine, a much larger number of cattle can be tested in a given time. I think great credit is due to Professor Buxton for sticking to his guns on the intradermal test, and to Major Catmur for giving us an ideal technique for the performance of the test. Some men whose knowledge of human beings is perhaps greater than that concerning animals are constantly putting America before us as a country of milk pasteurisation. It is quite time that the spade work done in that country and here long before pasteurisation was thought of should be given equal prominence in all clean milk discussions.—Yours faithfully, G. MAYALL.

Bolton.

White Heifer Disease.

To the Editor of The Veterinary Record.

Sir,—Regarding the article by Mr. W. F. Aston and Mr. Stinson's comments thereon, I do not quite agree. Mr. Aston doubts that the enormous scar tissue would be a serious hindrance to delivery at the end of pregnancy; I think that it is impossible for conception to take place under such conditions. I agree with Mr. Stinson that little or no scar tissue is left after operation in a plain uncomplicated case of white heifer disease, but in a great many cases the history is, that the animal has been served a few days previous and has been straining and bleeding slightly ever since.

In examining such cases per vagina, one feels a thick-ended, swollen, torn mass; per rectum often very little fluid can be detected in front of the swelling—still, *post-mortem* proves that white heifer disease is the cause of the trouble. Like Mr. Aston, I often fail to puncture the mass and release the fluid.

In cases where there is no history of injury by the bull, the animal has been noticed to be straining at intervals, with a tendency to this becoming more constant; the much-distended vagina can be easily felt pe. rectum. It is not a difficult matter to puncture the membrane and release the contents. A few syringings out generally effect a speedy cure.

I wonder whether there are not cases where the act of service punctures the membrane and effects a cure unknown to anyone?—Yours faithfully, Wm. A. Campbell.

Boroughbridge,
Yorks.,
26*th March*, 1927.

The "Clean Milk" Party.

To the Editor of The Veterinary Record.

Sir,—Being one of the fortunate members of Major Hobday's "Clean Milk" party, I appreciate the descriptive account in this week's *Veterinary Record*, but wish to point out the inaccuracy relating to the Stable department in three ways, *viz.*:—

1. *There are* 217 *horses* employed, and which were viewed in the Stable;
2. There has been an increase of 60 to the Stud just recently;
3. Each horse has a daily allowance of 28 lbs. of hay chop, comprising chaff, maize, and beans, but oats were not seen (I consider that half this weight in good oats and mixture chaff would be a more suitable diet).—Yours faithfully, J. W. Pritchard.

255 Preston Road,
Brighton,
27*th March*, 1927.

The Editor acknowledges the receipt of the following:

Seventh Annual Agricultural Report of the Colony and Protectorate of Kenya.

Report of the Annual Meeting of the Western Counties Division, from Mr. R. B. Nelder, Hon. Secretary.

Report of a Meeting of the Lancashire Division, from Mr. J. Spruell, Hon. Secretary.

Communications from Lieut.-Col. J. W. Rainey (Bow), Messrs. W. J. Rice (Montrose), R. H. Smythe (Camborne), W. L. Stewart (Newcastle-on-Tyne), D. E. Wilkinson, R.V.C., and J. H. Wynne (Denbigh).

National Veterinary Medical Association of Great Britain and Ireland.

EDITORIAL OFFICE: 10 Gray's Inn Square, London W.C.1.

All communications relative to the literary side of the Veterinary Record must be addressed to the Assistant Editor, "Veterinary Record," 10 Gray's Inn Square, W.C.1

RICHARDSONS of LEICESTER

For all requirements of the Veterinary Surgeon.
Quality and Service the first consideration.

Cattle Drenches. Alterative, Astringent, Chill, Cleansing, Felon, &c., &c.

Horse Balls. Gelatine coated or paper wrapped. Physic—only the finest Barbadoes Aloes employed—Cough, Condition, Tonic, &c., &c.

Horse Powders. In Tins or 1 oz. Packets.

Stock Formulæ. Private Recipes.

ACCURACY AND PROMPTNESS. CORRESPONDENCE INVITED.

JOHN RICHARDSON & Co. (LEICESTER) LTD.,
Manufacturing Veterinary Chemists.